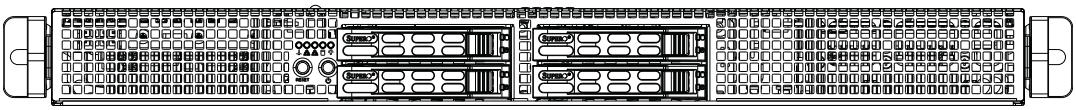
SUPERMICRO®

SUPERSERVER

1027GR-TRF



USER'S MANUAL

Revision 1.0

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WARNING: Handling of lead solder materials used in this product may expose you to lead, a chemical known to the State of California to cause birth defects and other reproductive harm.

Manual Revision 1.0
Release Date: February 28, 2012

Preface

About This Manual

This manual is written for professional system integrators and PC technicians. It provides information for the installation and use of the SuperServer 1027GR-TRF. Installation and maintenance should be performed by experienced technicians only.

The 1027GR-TRF is based on the SC118GQ-R1800B 1U rackmount server chassis and the Super X9DRG-HF serverboard. Please refer to our web site for an up-to-date list of supported operating systems, processors and memory. See Chapter 1 for a list of differences between the server models.

Manual Organization

Chapter 1: Introduction

The first chapter provides a checklist of the main components included with the server system and describes the main features of the Super X9DRG-HF serverboard and the SC118GQ-R1800B chassis.

Chapter 2: Server Installation

This chapter describes the steps necessary to install the system into a rack and check out the server configuration prior to powering up the system. If your server was ordered without the processor and memory components, this chapter will refer you to the appropriate sections of the manual for their installation.

Chapter 3: System Interface

Refer to this chapter for details on the system interface, which includes the functions and information provided by the control panel on the chassis as well as other LEDs located throughout the system.

Chapter 4: System Safety

You should thoroughly familiarize yourself with this chapter for a general overview of safety precautions that should be followed when installing and servicing the system.

Chapter 5: Advanced Serverboard Setup

Chapter 5 provides detailed information on the X9DRG-HF serverboard, including the locations and functions of connectors, headers and jumpers. Refer to this chapter when adding or removing processors or main memory and when reconfiguring the serverboard.

Chapter 6: Advanced Chassis Setup

Refer to Chapter 6 for detailed information on the SC118GQ-R1800B 1U rackmount server chassis. You should follow the procedures given in this chapter when installing, removing or reconfiguring SATA or peripheral drives and when replacing system power supply units and cooling fans.

Chapter 7: BIOS

The BIOS chapter includes an introduction to BIOS and provides detailed information on running the BIOS Setup Utility.

Appendix A: BIOS Error Beep Codes

Appendix B: System Specifications

Notes

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Chapter 3 System Interface

Chapter 4 System Safety

Chapter 5 Advanced Serverboard Setup

Chapter 1

Introduction

1-1 Overview

The SuperServer 1027GR-TRF series is a GPU-optimized server comprised of two main subsystems: the SC118GQ-R1800B 1U server chassis and the X9DRG-HF serverboard. Please refer to our web site for information on operating systems that have been certified for use with the system (www.supermicro.com).

- Two 4-cm counter-rotating fans (FAN-0117L4)
- Eight 4-cm counter-rotating fans (FAN-0102L4)
- One air shroud (MCP-310-11802-0N)
- Two passive CPU heatsinks (one each of SNK-P0047PS and SNK-P0047PSC)
- Riser Cards
  One RSC-R1UG-E16A-X9 for PCI-Express 3.0 x16 card. left front side
  One RSC-R1UG-E16B-X9 for PCI-Express 3.0 x16 card, left rear side
  One RSC-R1UG-E16AR-X9 for PCI-Express 3.0 x16 card, right front side
  One RSC-R1UG-E16R-X9 for PCI-Express 3.0 x8 low-profile card, above serverboard
- Three power cables for GPU cards (CBL-0333L)
- SATA Accessories
  One SAS backplane (BPN-SAS-118G-4)
  Four hot-swap drive carriers (MCP-220-00047-0B)
  Four SATA cables (CBL-0207L, CBL-0227L, 2 pcs. of CBL-0228L)
  One SGPIO cable (CBL-0157L)
- One rail set (MCP-290-00054-0N)
- One Super Server 1027GR-TRF User's Manual

1-2 Serverboard Features

At the heart of the SuperServer 1027GR-TRF server is the X9DRG-HF, a dual processor serverboard based on the Intel C602 chipset. Below are the main features of the X9DRG-HF. (See Figure 1-1 for a block diagram of the chipset).

Processors

The X9DRG-HF supports two Intel Xeon E5-2600 series processors in LGA 2011 sockets (Socket R). Please refer to the serverboard description pages on our web site for a complete listing of supported processors (www.supermicro.com).

Memory

The X9DRG-HF has eight DIMM slots that can support up to 256 GB of registered ECC DDR3-1600/1333/1066/800 MHz RDIMMs. Modules of the same size and speed are recommended. See Chapter 5 for details.

Serial ATA

A SATA controller is integrated into the chipset to provide a 4-port SATA subsystem, which is RAID 0, 1, 5 and 10 supported. Two of these are SATA 3.0 ports and two are SATA 2.0 ports. The SATA drives are hot-swappable units.

Note: The operating system you use must have RAID support to enable the hot-swap capability and RAID function of the SATA drives.

PCI Expansion Slots

The X9DRG-HF has three PCI-Express 3.0 x16 slots to support three double-width GPU cards. Additional slots support one PCI-Express 3.0 x8 low-profile card.

Onboard Controllers/Ports

The color-coded I/O ports include one COM port (an additional COM header is located on the serverboard), a VGA (monitor) port, two USB 2.0 ports, two Gb Ethernet LAN ports (or two optional 10 Gb ports) and one dedicated IPMI LAN port.

IPMI

IPMI (Intelligent Platform Management Interface) is a hardware-level interface specification that provides remote access, monitoring and administration for Supermicro server platforms. IPMI allows server administrators to view a server's hardware

status remotely, receive an alarm automatically if a failure occurs, and power cycle a system that is non-responsive.

1-3 Server Chassis Features

System Power

The SC118GQ-R1800B features a high-efficiency, redundant 1800W power supply composed of two separate power modules. This power redundancy feature allows you to replace a failed power supply without shutting down the system. See Chapter 6 for details.

SATA Subsystem

The SC118GQ-R1800B chassis includes four 2.5" drive bays, which may be used to house hot-swappable SATA drives. RAID 0, 1, 5 and 10 are supported.

Front Control Panel

The control panel provides a system monitoring and control interface. LEDs indicate system power, HDD activity, network activity, and a system overheat/fan fail/ UID LED. A main power button and a system reset button are also included.

Cooling System

The SC118GQ-R1800B has an innovative cooling design that includes ten 4-cm counter-rotating PWM (Pulse Width Modulated) fans. The power supply modules also include a cooling fan. All chassis and power supply fans operate continuously. An air shrouds is included to further help cool the GPUs. See note on the following page regarding fan control.

1-4 GPU Subsystem

The 1027GR-TRF server represents one of Supermicro's massively parallel processing multiple-GPU servers, with support for up to three GPUs. NVIDIA® Fermi™ GPUs place this system at the forefront of today's GPU computing solutions.

Please refer to the NVIDIA web site (www.nvidia.com) for details on Fermi GPUs.

Notes

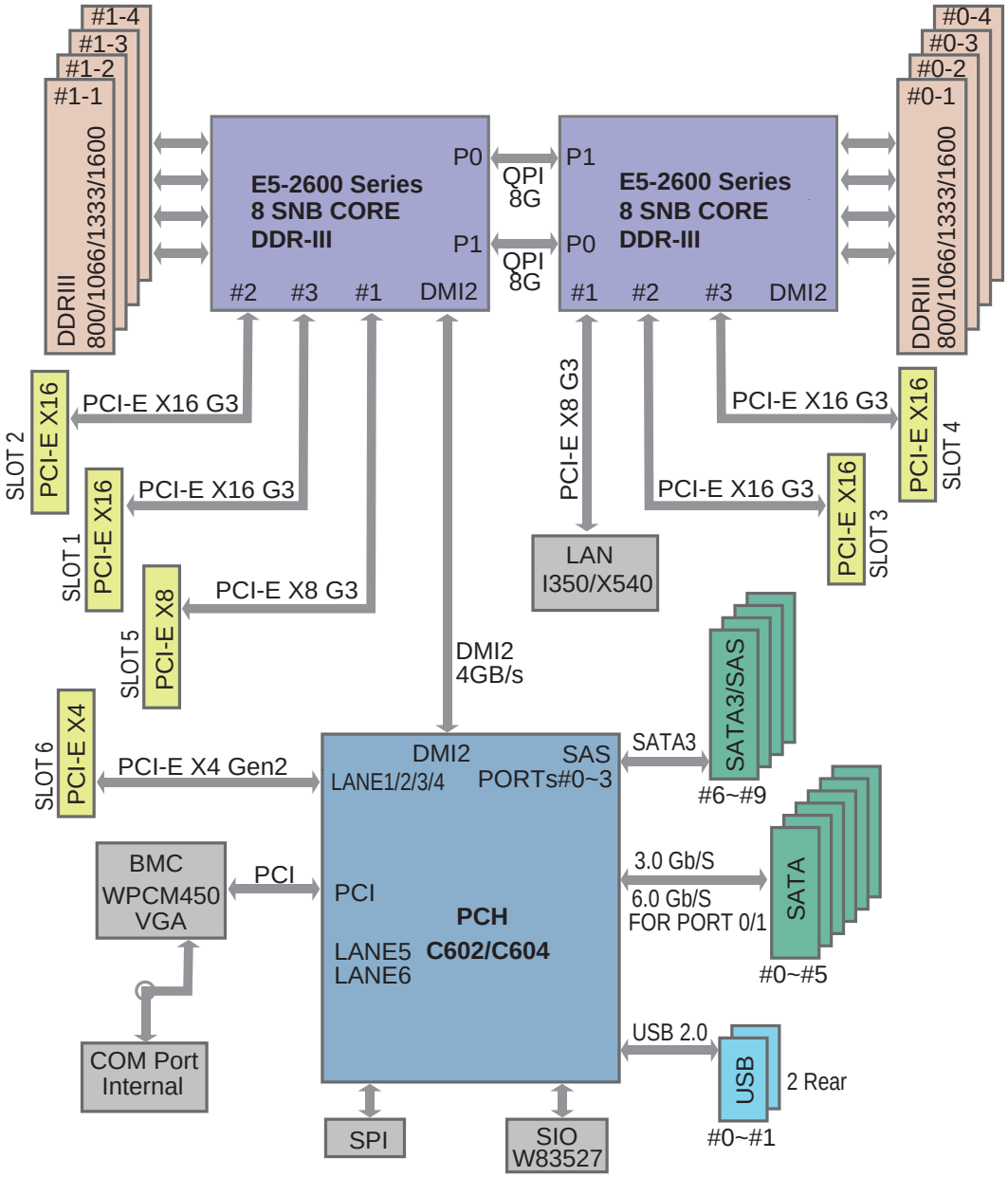
The GPUs can be bundled with the system as follows:

1027GR-TRF-FM309: includes three NVIDIA Fermi M2090 GPUs.

1027GR-TRF-FM375: includes three NVIDIA Fermi M2075 GPUs

Figure 1-1. Intel C602 Chipset:
System Block Diagram

Note: This is a general block diagram. Please see Chapter 5 for details.



1-5 Contacting Supermicro

Headquarters

Address:	Super Micro Computer, Inc.
	980 Rock Ave.
	San Jose, CA 95131 U.S.A.
Tel:	+1 (408) 503-8000
Fax:	+1 (408) 503-8008
Email:	marketing@supermicro.com (General Information)
	support@supermicro.com (Technical Support)
Web Site:	www.supermicro.com

Europe

Address:	Super Micro Computer B.V.
	Het Sterrenbeeld 28, 5215 ML
	's-Hertogenbosch, The Netherlands
Tel:	+31 (0) 73-6400390
Fax:	+31 (0) 73-6416525
Email:	sales@supermicro.nl (General Information)
	support@supermicro.nl (Technical Support)
	rma@supermicro.nl (Customer Support)

Asia-Pacific

Address:	Super Micro, Taiwan
	4F, No. 232-1, Liancheng Rd.
	Chung-Ho 235, Taipei County
	Taiwan, R.O.C.
Tel:	+886-(2) 8226-3990
Fax:	+886-(2) 8226-3991
Web Site:	www.supermicro.com.tw
Technical Support:	
Email:	support@supermicro.com.tw
Tel:	886-2-8226-5990

Chapter 2

Server Installation

2-1 Overview

This chapter provides a quick setup checklist to get your system up and running. Following these steps in the order given should enable you to have the system operational within a minimum amount of time. This quick setup assumes that your system has come to you with the processors and memory preinstalled. If your system is not already fully integrated with a serverboard, processors, system memory etc., please turn to the chapter or section noted in each step for details on installing specific components.

2-2 Unpacking the System

You should inspect the box the system was shipped in and note if it was damaged in any way. If the server itself shows damage you should file a damage claim with the carrier who delivered it.

Decide on a suitable location for the rack unit that will hold the server. It should be situated in a clean, dust-free area that is well ventilated. Avoid areas where heat, electrical noise and electromagnetic fields are generated. You will also need it placed near a grounded power outlet. Read the Rack and Server Precautions in the next section.

2-3 Preparing for Setup

The box the server was shipped in should include two sets of rail assemblies, two rail mounting brackets and the mounting screws you will need to install the system into the rack. Follow the steps in the order given to complete the installation process in a minimum amount of time. Please read this section in its entirety before you begin the installation procedure outlined in the sections that follow.

Choosing a Setup Location

- Leave enough clearance in front of the rack to enable you to open the front door completely (~25 inches) and approximately 30 inches of clearance in the back of the rack to allow for sufficient airflow and ease in servicing.This product is for installation only in a Restricted Access Location (dedicated equipment rooms, service closets and the like).

- This product is not suitable for use with visual display work place devices acccording to §2 of the the German Ordinance for Work with Visual Display Units.

Warnings and Precautions!

Rack Precautions

- Ensure that the leveling jacks on the bottom of the rack are fully extended to the floor with the full weight of the rack resting on them.
- In single rack installation, stabilizers should be attached to the rack. In multiple rack installations, the racks should be coupled together.
- Always make sure the rack is stable before extending a component from the rack.
- You should extend only one component at a time - extending two or more simultaneously may cause the rack to become unstable.
- Rack-mounted equipment should not be used as a shelf or work space.

Server Precautions

- Review the electrical and general safety precautions in Chapter 4.
- Determine the placement of each component in the rack *before* you install the rails.
- Install the heaviest server components on the bottom of the rack first, and then work up.
- Use a regulating uninterruptible power supply (UPS) to protect the server from power surges, voltage spikes and to keep your system operating in case of a power failure.
- Allow the hot plug SATA drives and power supply modules to cool before touching them.

- Always keep the rack's front door and all panels and components on the servers closed when not servicing to maintain proper cooling.

Rack Mounting Considerations

Ambient Operating Temperature

If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than the ambient temperature of the room. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra).

Reduced Airflow

Equipment should be mounted into a rack so that the amount of airflow required for safe operation is not compromised.

Mechanical Loading

Equipment should be mounted into a rack so that a hazardous condition does not arise due to uneven mechanical loading.

Circuit Overloading

Consideration should be given to the connection of the equipment to the power supply circuitry and the effect that any possible overloading of circuits might have on overcurrent protection and power supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

Reliable Ground

A reliable ground must be maintained at all times. To ensure this, the rack itself should be grounded. Particular attention should be given to power supply connections other than the direct connections to the branch circuit (i.e. the use of power strips, etc.).

2-4 Installing the System into a Rack

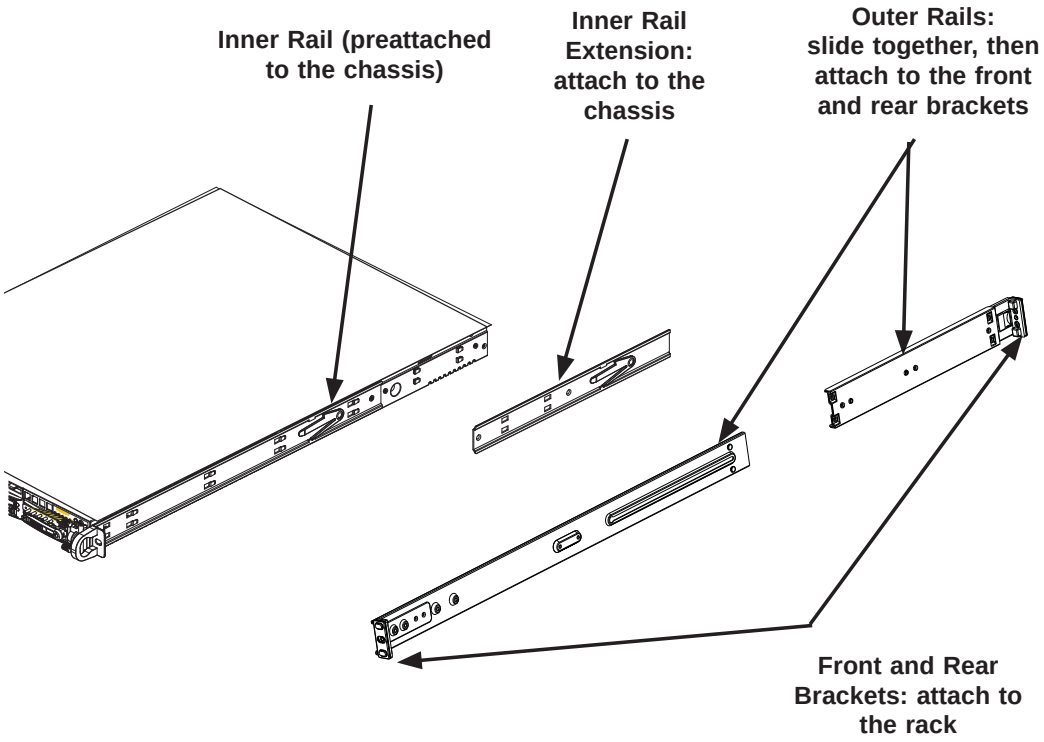
This section provides information on installing the SC118GQ chassis into a rack unit with the rails provided. There are a variety of rack units on the market, which may mean that the assembly procedure will differ slightly. You should also refer to the installation instructions that came with the rack unit you are using.

Note: This rail will fit a rack between 26" and 33.5" deep.

Identifying the Sections of the Rack Rails

The chassis package includes two rack rail assemblies in the rack mounting kit. Each assembly consists of two sections: an inner fixed chassis rail that secures directly to the server chassis and an outer fixed rack rail that secures directly to the rack itself.

Figure 2-1. Identifying the Sections of the Rack Rails



Installing the Inner Rail Extensions

The SC118GQ chassis includes a set of inner rack rails in two sections: inner rails (A) and inner rail extensions (B). The inner rails are preattached and do not interfere with normal use of the chassis if you decide not to install to a server rack. Attaching the inner rail extensions to to the inner rails stabilizes the chassis within the rack.

Installing the Inner Rail Extensions

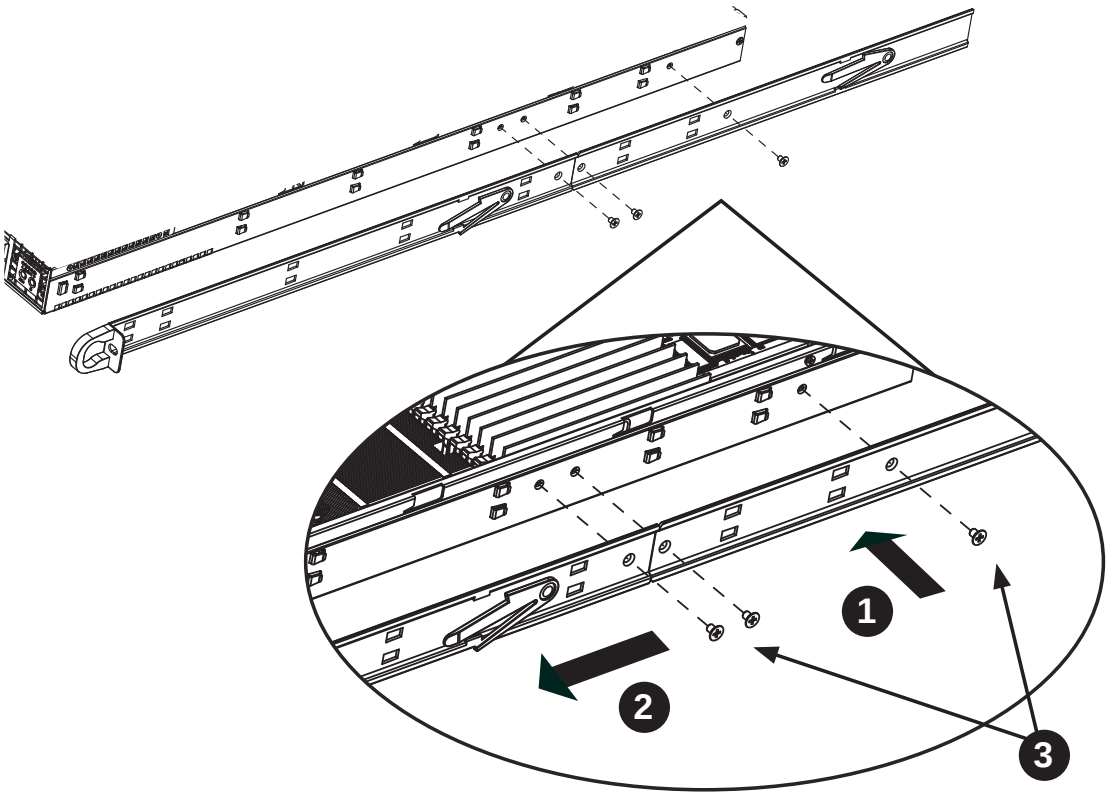
1. Place the inner rail extensions (B) over the preattached inner rails (A) which are attached to the side of the chassis. Align the hooks of the inner rail with the rail extension holes. Make sure the extension faces "outward" just like the inner rail.

2. Slide the extension toward the front of the chassis.

3. Secure the chassis with screws as illustrated.

4. Repeat steps 1-3 for the other inner rail extension.

Figure 2-2. Installing the Inner Rails



Assembling the Outer Rails

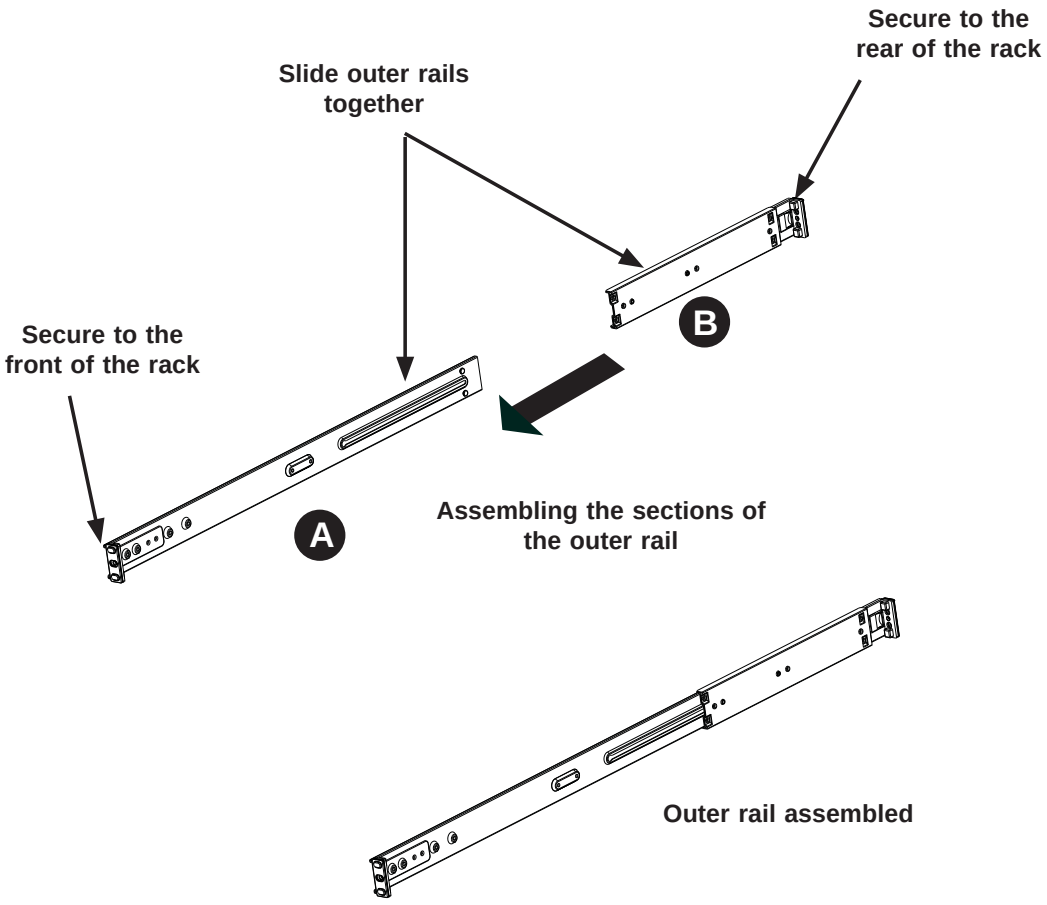
Each outer rail is in two sections that must be assembled before mounting on to the rack.

Assembling the Outer Rails

1. Identify the left and right outer rails by examining the ends, which bend outward.

2. Slide the front section of the outer rail (A), into the rear section of the outer rail (B).

Figure 2-3. Assembling the Outer Rails



Installing the Outer Rails onto the Rack

Outer Rail Installation

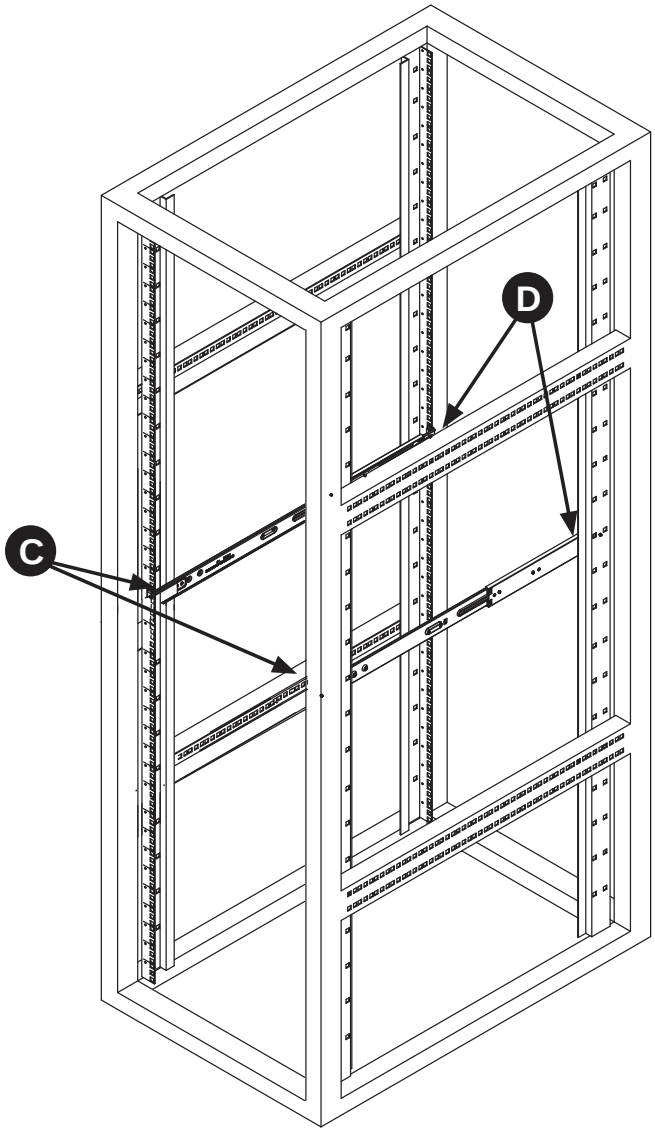
1. Adjust the outer rails to the proper length so that the outer rail fits snugly within the rack.

2. Align the holes on the front of the outer rail, with the holes on the front of the rack (C) and secure with the screws provided.

3. Align the holes on the rear of the outer rail to the holes on the rack (D) and secure with the screws provided.

4. Repeat the procedure with the second outer rail assembly.

Figure 2-4. Installing the Outer Rails to the Rack



Installing and Removing the Chassis From a Rack

Installation into a Rack

1. Slide the inner rail extensions into the front of the outer rails.

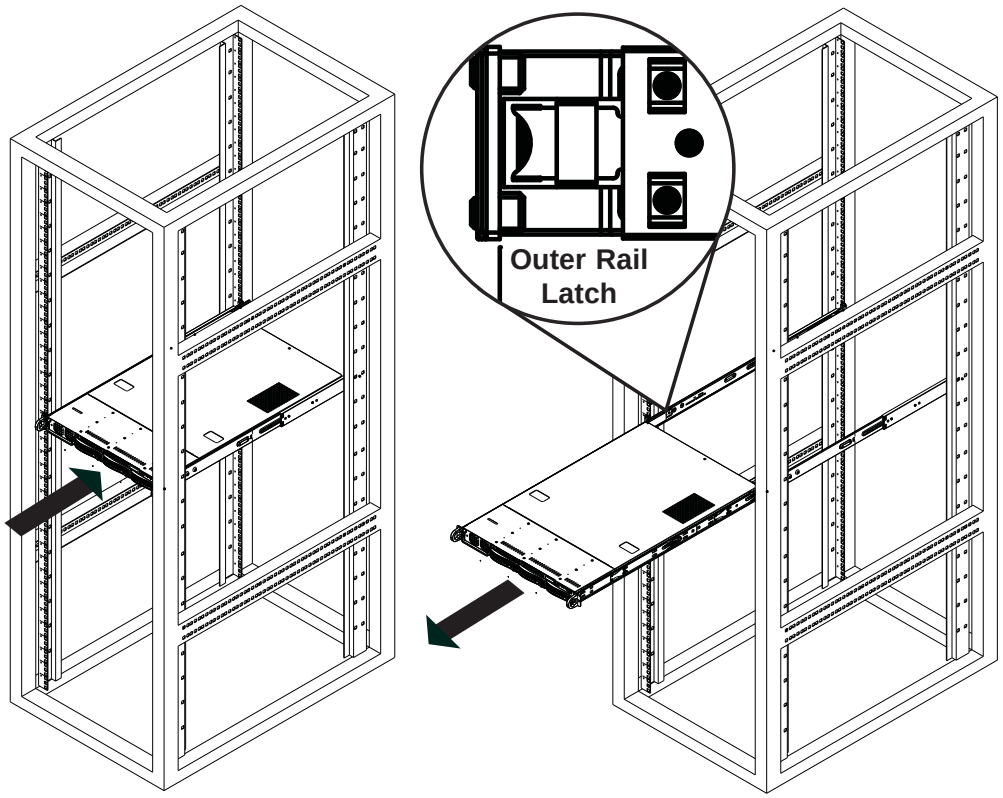
2. Push the chassis backward into the rack until it clicks into the locked postion.

Removing the Chassis From a Rack

1. Press the outer rail latch to release the chassis.

2. Carefully slide the chassis forward, off the outer rails and out of the chassis.

Figure 2-5: Chassis Installation **Figure 2-6: Chassis Removal**

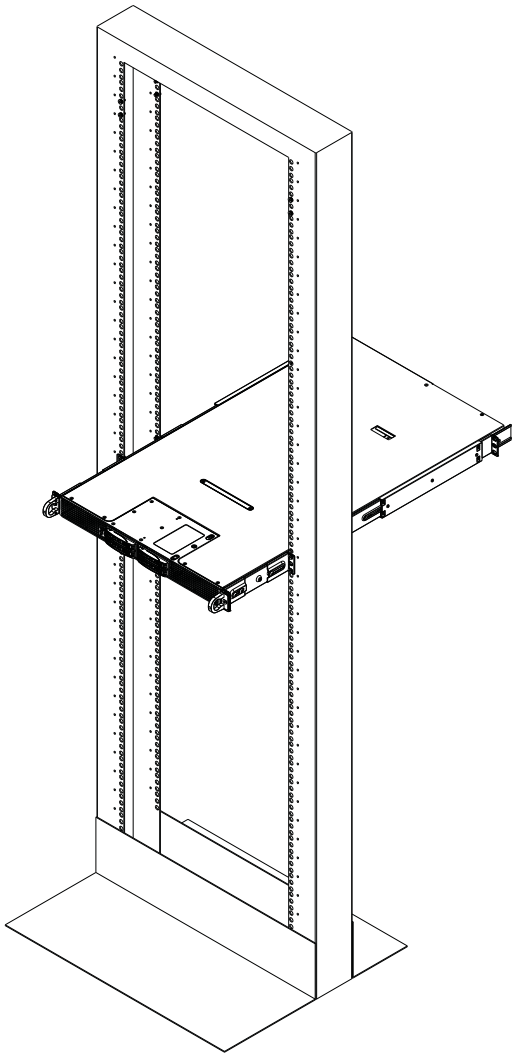


Installing the Server into a Telco Rack

Optional brackets are needed to install the server to a telco (open type) rack.

To install the server into a Telco type rack, use the two L-shaped brackets on either side of the chassis (four total). First, determine how far follow the server will extend out the front of the rack. Larger chassis should be positioned to balance the weight between front and back. If a bezel is included on your server, remove it. Then attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the telco rack. Finish by sliding the chassis into the rack and tightening the brackets to the rack.

Figure 2-6. Installing the Server into a Telco Rack



Notes

Chapter 3

System Interface

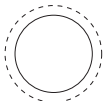
3-1 Overview

There are several LEDs on the control panel as well as others on the drive carriers to keep you constantly informed of the overall status of the system as well as the activity and health of specific components. There are also two buttons on the chassis control panel. This chapter explains the meanings of all LED indicators and the appropriate response you may need to take.

3-2 Control Panel Buttons

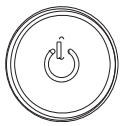
There are two push-buttons located on the front of the chassis: a reset button and a power on/off button.

RESET



Reset

Use the reset button to reboot the system.



Power

The main power button is used to apply or remove power from the power supply to the server system. Turning off system power with this button removes the main power but keeps standby power supplied to the system.

3-3 Control Panel LEDs

The two control panels are located on the front of the SC118GQ chassis. Each control panel has six LEDs. These LEDs provide critical information related to different parts of the system. This section explains what each LED indicates when illuminated and any action that may be required..

Overheat/Fan Fail/UID LED

When this LED flashes it indicates a fan failure. When continuously on (not flashing) it indicates an overheat condition, which may be caused by cables obstructing the airflow in the system or the ambient room temperature being too warm. Check the routing of the cables and make sure that all fans are present and operating normally. Also check to make sure that the air shrouds are installed and that the top cover is on. Finally, verify that the heatsinks are installed properly. This LED will remain flashing or on as long as the overheat condition exists. When used with a UID-compatible motherboard, the UID function is used to turn on or off the blue light function of the the LED. Once the blue light is activated through the system software, the unit can be easily located in very large racks and server banks.

NIC2

Indicates network activity on GLAN2 when flashing .

NIC1

Indicates network activity on GLAN1 when flashing .

HDD

This light indicates SATA and/or peripheral drive activity when flashing.

Power

Indicates power is being supplied to the system's power supply units. This LED should normally be illuminated when the system is operating.

3-4 Drive Carrier LEDs

- **Green:** Each hard drive carrier (for use with SATA drives) has a green LED. When illuminated, this green LED (on the front of the SATA drive carrier) indicates drive activity. A connection to the backplane enables this LED to blink on and off when that particular drive is being accessed. Please refer to Chapter 6 for instructions on replacing failed SATA drives.

- **Red:** The red LED to indicate a SATA drive failure. If one of the SATA drives fail, you should be notified by your system management software. Please refer to Chapter 6 for instructions on replacing failed SATA drives.

Notes

Chapter 4

System Safety

4-1 Electrical Safety Precautions

Note: power should always be disconnected before performing any service on the system.

Basic electrical safety precautions shall be followed to protect yourself from harm and the server from damage:

- Be aware of the locations of the power on/off switch on the chassis as well as the room's emergency power-off switch, disconnection switch or electrical outlet. If an electrical accident occurs, you can then quickly remove power from the system.
- Do not work alone when working with high voltage components.
- Power should always be disconnected from the system when removing or installing main system components, such as the serverboard, memory modules and floppy drive. When disconnecting power, you should first power down the system with the operating system first and then unplug the power cords of all the power supply units in the system.
- When working around exposed electrical circuits, another person who is familiar with the power-off controls should be nearby to switch off the power if necessary.
- Use only one hand when working with powered-on electrical equipment. This is to avoid making a complete circuit, which will cause electrical shock. Use extreme caution when using metal tools, which can easily damage any electrical components or circuit boards they come into contact with.
- Do not use mats designed to decrease static electrical discharge as protection from electrical shock. Instead, use rubber mats that have been specifically designed as electrical insulators.
- The power supply power cords must include a grounding plug and must be plugged into grounded electrical outlets.

- This product may be connected to an IT power system. In all cases, make sure that the unit is also reliably connected to Earth (ground).

- Serverboard Battery: **CAUTION** - There is a danger of explosion if the onboard battery is installed upside down, which will reverse its polarites (see Figure 4-1). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer (CR2032). Dispose of used batteries according to the manufacturer's instructions.

- DVD-ROM Laser: **CAUTION** - this server may have come equipped with a DVD-ROM drive. To prevent direct exposure to the laser beam and hazardous radiation exposure, do not open the enclosure or use the unit in any unconventional way.

- Mainboard replaceable soldered-in fuses: Self-resetting PTC (Positive Temperature Coefficient) fuses on the mainboard must be replaced by trained service technicians only. The new fuse must be the same or equivalent as the one replaced. Contact technical support for details and support.

4-2 General Safety Precautions

Follow these rules to ensure general safety:

- Keep the area around the server clean and free of clutter.

- The server weighs approximately 37 lbs. (16.8 kg) when fully loaded. When lifting the system, two people at either end should lift slowly with their feet spread out to distribute the weight. Always keep your back straight and lift with your legs.

- Place the chassis top cover and any system components that have been removed away from the system or on a table so that they won't accidentally be stepped on.

- While working on the system, do not wear loose clothing such as neckties and unbuttoned shirt sleeves, which can come into contact with electrical circuits or be pulled into a cooling fan.

- Remove any jewelry or metal objects from your body, which are excellent metal conductors that can create short circuits and harm you if they come into contact with printed circuit boards or areas where power is present.

- After accessing the inside of the system, close the system back up and secure it to the rack unit with the retention screws after ensuring that all connections have been made.

4-3 ESD Precautions

Electrostatic Discharge (ESD) is generated by two objects with different electrical charges coming into contact with each other. An electrical discharge is created to neutralize this difference, which can damage electronic components and printed circuit boards. The following measures are generally sufficient to neutralize this difference before contact is made to protect your equipment from ESD:

- Use a grounded wrist strap designed to prevent static discharge.

- Keep all components and printed circuit boards (PCBs) in their antistatic bags until ready for use.

- Touch a grounded metal object before removing the board from the antistatic bag.

- Do not let components or PCBs come into contact with your clothing, which may retain a charge even if you are wearing a wrist strap.

- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or contacts.

- When handling chips or modules, avoid touching their pins.

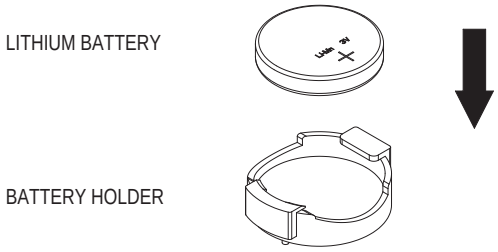
- Put the serverboard and peripherals back into their antistatic bags when not in use.

- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

4-4 Operating Precautions

Care must be taken to assure that the chassis cover is in place when the system is operating to ensure proper cooling. Out of warranty damage to the system can occur if this practice is not strictly followed.

Figure 4-1. Installing the Onboard Battery



Please handle used batteries carefully. Do not damage the battery in any way; a damaged battery may release hazardous materials into the environment. Do not discard a used battery in the garbage or a public landfill. Please comply with the regulations set up by your local hazardous waste management agency to dispose of your used battery properly.

Chapter 5

Advanced Serverboard Setup

This chapter covers the steps required to install the X9DRG-HF serverboard into the chassis, connect the data and power cables and install add-on cards. All serverboard jumpers and connections are also described. A layout and quick reference chart are included in this chapter for your reference. Remember to completely close the chassis when you have finished working with the serverboard to better cool and protect the system.

5-1 Handling the Serverboard

Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully (see previous chapter). To prevent the serverboard from bending, keep one hand under the center of the board to support it when handling. The following measures are generally sufficient to protect your equipment from electric static discharge.

Precautions

- Use a grounded wrist strap designed to prevent Electrostatic Discharge (ESD).
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

Unpacking

The serverboard is shipped in antistatic packaging to avoid electrical static discharge. When unpacking the board, make sure the person handling it is static protected.

5-2 Serverboard Installation

This section explains the first step of physically mounting the X9DRG-HF into the SC118GQ chassis. Following the steps in the order given will eliminate the most common problems encountered in such an installation. To remove the serverboard, follow the procedure in reverse order.

Installing to the Chassis

1. Access the inside of the system by removing the screws from the back lip of the top cover of the chassis, then pull the cover off.

2. Make sure that the I/O ports on the serverboard align properly with their respective holes in the I/O shield at the back of the chassis.

3. Carefully mount the serverboard to the serverboard tray by aligning the board holes with the raised metal standoffs that are visible in the chassis.

4. Insert screws into all the mounting holes on your serverboard that line up with the standoffs and tighten until snug (if you screw them in too tight, you might strip the threads). Metal screws provide an electrical contact to the serverboard ground to provide a continuous ground for the system.

5. Install the processors and make all necessary cable connections, as described in the sections that follow.

Warning: To avoid damaging the serverboard and its components, do not apply any force greater than 8 lbs. per square inch when installing a screw into a mounting hole.

5-3 Connecting Cables

Now that the serverboard is installed, the next step is to connect the cables to the board. These include the data (ribbon) cables for the peripherals and control panel and the power cables.

Connecting Data Cables

The ribbon cables used to transfer data from the peripheral devices have been carefully routed to prevent them from blocking the flow of cooling air that moves through the system from front to back. If you need to disconnect any of these cables, you should take care to keep them routed as they were originally after reconnecting them (make sure the red wires connect to the pin 1 locations). The following data cables (with their locations noted) should be connected. (See the layout on page 5-12 for connector locations.)

- SATA drive data cables (I-SATA0 ~ 3)
- SATA sideband cable (T-SGPIO ~ 1)
- Control Panel cable (JF1)
- GPU power cables (JPW3, JPW7 and JPW11)
- SATA backplane power cable (JPW5)

Important! Make sure the the cables do not come into contact with the fans.

Connecting Power Cables

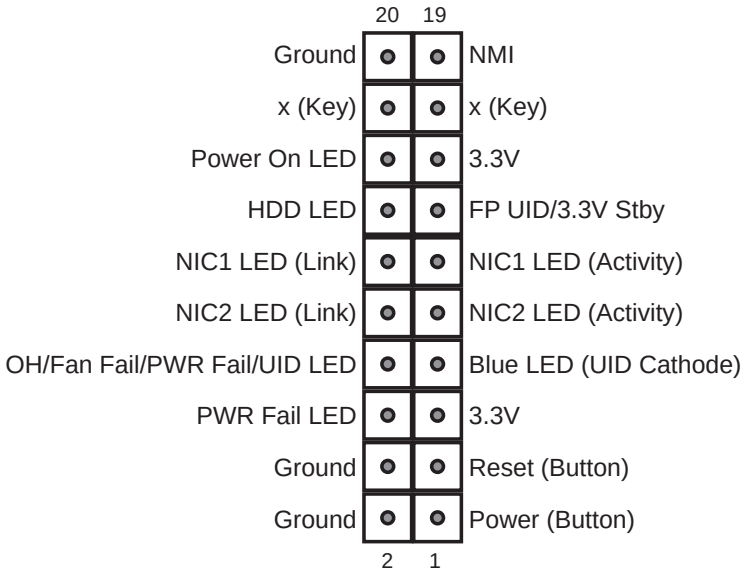
The X9DRG-HF has three proprietary power supply connectors (JPW1, JPW2 and JPW9) for connection to the ATX power supply. See Section 5-9 for power connector pin definitions.

Connecting the Control Panel

JF1 contains header pins for various front control panel connectors. See Figure 5-1 for the pin locations of the various front control panel buttons and LED indicators.

All JF1 wires have been bundled into a single ribbon cable to simplify this connection. Make sure the red wire plugs into pin 1 as marked on the board. The other end connects to the Control Panel PCB board, located just behind the system status LEDs on the chassis. See Chapter 5 for details and pin descriptions.

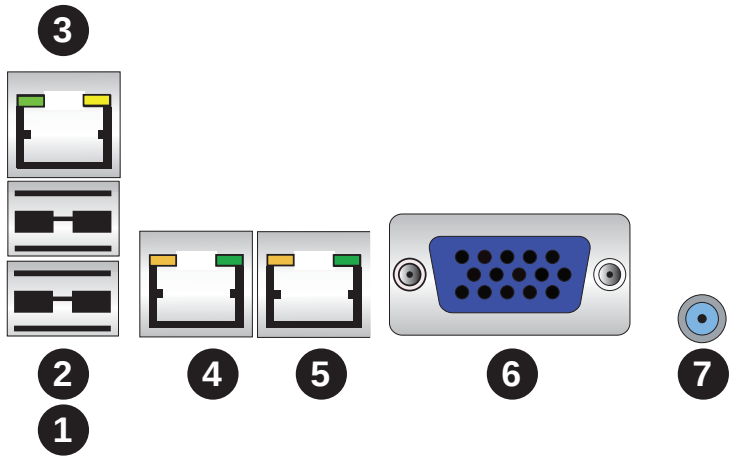
Figure 5-1. Control Panel Header Pins



5-4 I/O Ports

The I/O ports are color coded in conformance with the PC 99 specification. See Figure 5-2 below for the colors and locations of the various I/O ports.

Figure 5-2. I/O Ports



IO Ports			
1.	USB Port 0	5.	LAN Port 2
2.	USB Port 1	6.	VGA Port
3.	IPMI Dedicated LAN	7.	UID Switch
4.	LAN Port 1		

5-5 Installing the Processor and Heatsink

Avoid placing direct pressure to the top of the processor package. Always remove the power cord first before adding, removing or changing any hardware components.

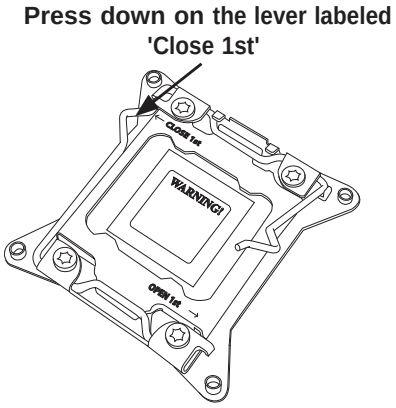
Notes:

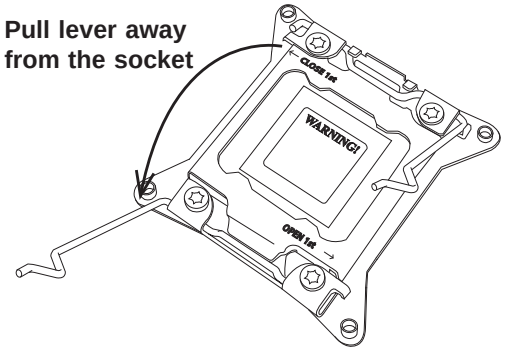
- Always connect the power cord last and always remove it before adding, removing or changing any hardware components. Make sure that you install the processor into the CPU socket before you install the CPU heatsink.
- If you buy a CPU separately, make sure that you use an Intel-certified multi-directional heatsink only.
- Make sure to install the serverboard into the chassis before you install the CPU heatsinks.
- When receiving a serverboard without a processor pre-installed, make sure that the plastic CPU socket cap is in place and none of the socket pins are bent; otherwise, contact your retailer immediately.
- Refer to the Supermicro web site for updates on CPU support.

Installing an LGA 2011 Processor

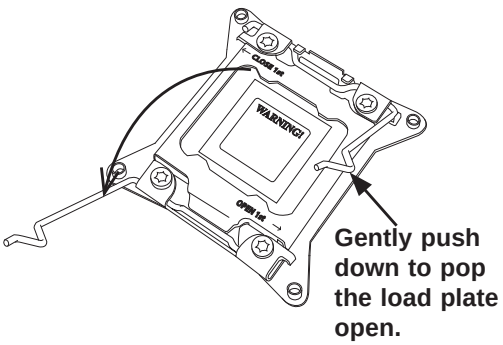
Follow the procedure below, beginning with the CPU1 socket.

1. There are two levers on the LGA 2011 socket. First press and release the load lever labeled 'Open 1st'.
2. Press the second load lever labeled 'Close 1st' to release the load plate from its locked position.



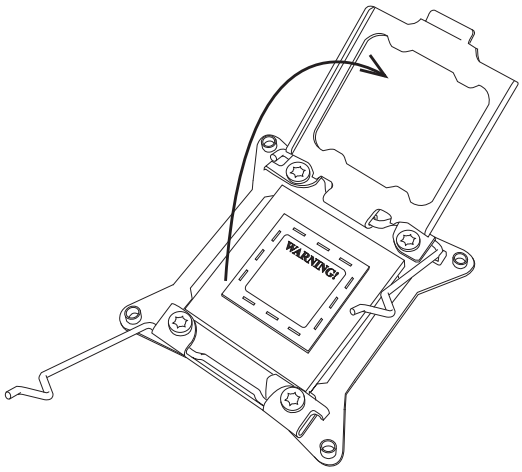


3. With the lever labeled 'Close 1st' fully retracted, gently push down on the 'Open 1st' lever to open the load plate. Lift the load plate to open it completely.

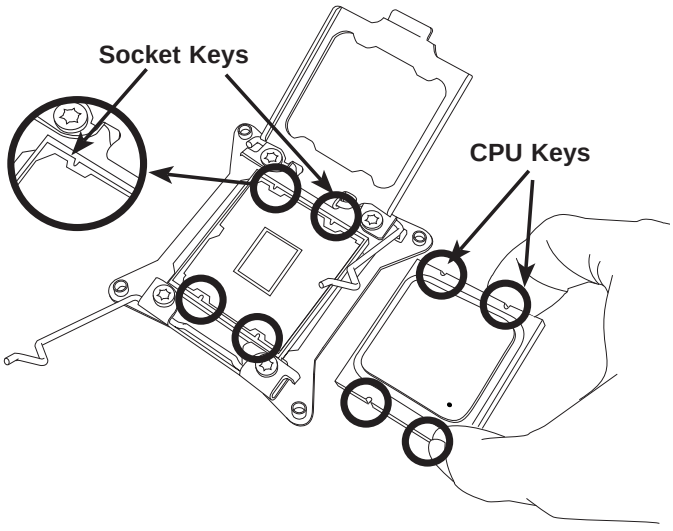


4. Using your thumb and the index finger, remove the 'WARNING' plastic cap from the socket.

5. Use your thumb and index finger to hold the CPU by its edges. Align the CPU keys, which are semi-circle cutouts, against the socket keys.



6. Once they are aligned, carefully lower the CPU straight down into the socket. (Do not drop the CPU on the socket. Do not move the CPU horizontally or vertically and do not rub the CPU against any pins of the socket, which may damage the CPU or the socket.)



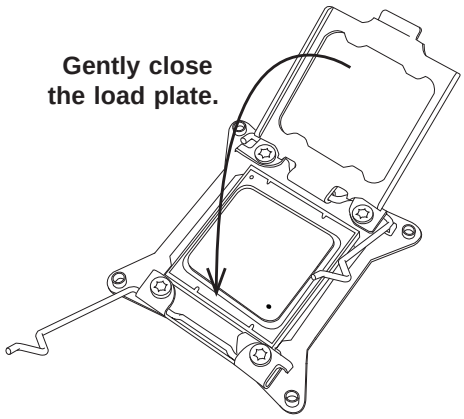
Warning: You can only install the CPU to the socket in one direction. Make sure that the CPU is properly inserted into the socket before closing the load plate. If it doesn't close properly, do not force it as it may damage your CPU. Instead, open the load plate again and double-check that the CPU is aligned properly.

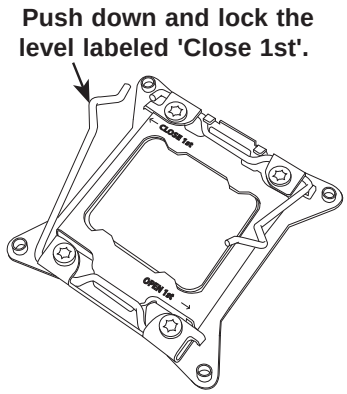
7. With the CPU in the socket, inspect the four corners of the CPU to make sure that they are flush with the socket.

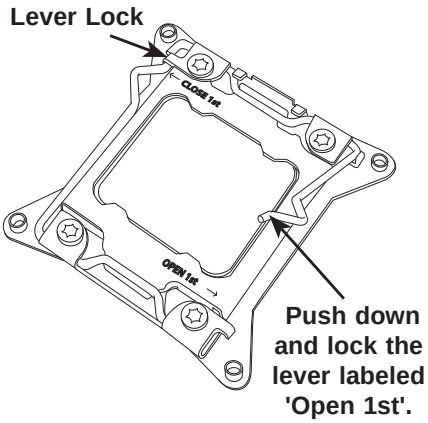
8. Close the load plate. Lock the lever labeled 'Close 1st', then lock the lever labeled 'Open 1st'. Use your thumb to gently push the load levers down until the lever locks.

9. Repeat the procedure to install a second processor in the CPU2 socket if desired.

Note: the PCI-E slots are controlled by the presence of a CPU. Slots will not be functional if the CPU that controls them is not installed. See Section 5-7 for details.







Installing a CPU Heatsink

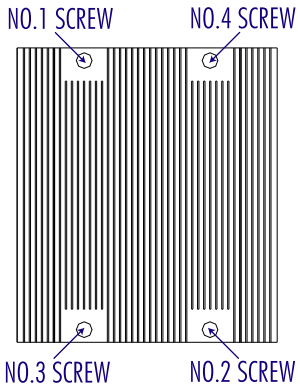
1. Remove power from the system and unplug the AC power cord from the power supply.

2. Do not apply any thermal grease to the heatsink or the CPU die; the required amount has already been applied.

3. Place the heatsink on top of the CPU so that the four mounting holes are aligned with those on the (preinstalled) heatsink retention mechanism.

4. Screw in two diagonal screws (i.e. the #1 and the #2 screws) until just snug. Do not fully tighten the screws or you may damage the CPU.)

5. Add the two remaining screws then finish the installation by fully tightening all four screws.



Removing the Heatsink

1. Unscrew and remove the heatsink screws from the serverboard in the sequence as show in the picture above.

2. Hold the heatsink and gently wriggle the heatsink to loosen it from the CPU. (Do not use excessive force when wriggling the heatsink!!)

3. Once the heatsink is loose, remove it from the CPU socket.

4. Clean the surface of the CPU and the heatsink to get rid of the old thermal grease. Reapply the proper amount of thermal grease on the surface before you re-install a heatsink.

Note: see Chapter 6 for details on installing the air shroud.

5-6 Installing Memory

CAUTION! Exercise extreme care when installing or removing DIMM modules to prevent any possible damage.

Memory Support

The X9DRG-HF supports up to 256 GB of registered ECC DDR3-1600/1333/1066/800 MHz RDIMMs in 8 DIMM slots. See the following tables for memory installation.

Notes: Memory speed support is dependent on the type of CPU used on the board.

Installing Memory Modules

1. Insert the desired number of DIMMs into the memory slots, starting with P1-DIMM 1A. For best memory performance, please install memory modules of the same type and same speed on the memory slots as indicated on the tables below.

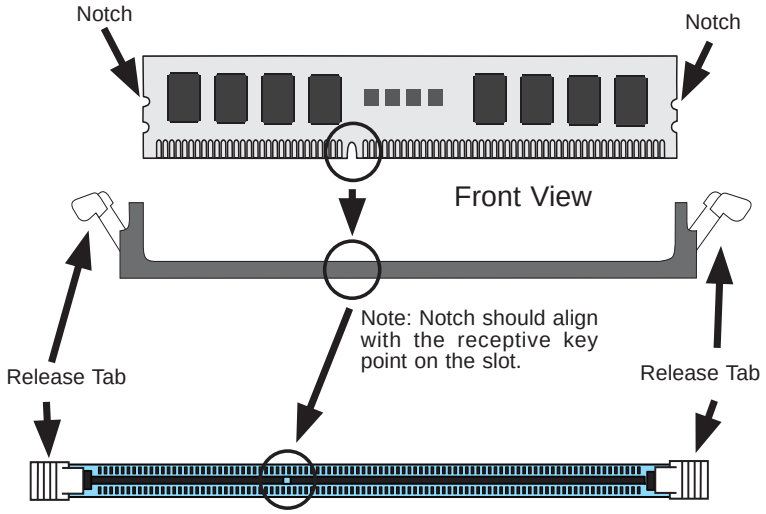
2. Insert each DIMM module vertically into its slot. Pay attention to the notch along the bottom of the module to avoid installing incorrectly (see Figure 5-4).

3. Gently press down on the DIMM module until it snaps into place in the slot. Repeat for all modules.

To Install: Insert module vertically and press down until it snaps into place. Pay attention to the alignment notch at the bottom.

To Remove:
Use your thumbs to gently push the release tabs near both ends of the module. This should release it from the slot.

Figure 5-3. DIMM Installation



Top View of DDR3 Slot

Processor/DIMM Population Configurations

For memory to work properly, follow the tables below for memory installation.

- For memory to operate properly, please install DIMMs in pairs (have an even number of DIMMs installed).
- All channels in a system will run at the fastest common frequency.

Processors and their Corresponding DIMMs				
CPU#	**Corresponding DIMM Modules**			
CPU 1	P1-A1	P1-B1	P1-C1	P1-D1
CPU2	P2-E1	P2-F1	P2-G1	P2-H1

Populating DIMMs	
Number of CPUs+DIMMs	**CPU and DIMM Population Configuration Table (For memory to work proper, please install DIMMs in pairs)**
1 CPU & 2 DIMMs	CPU1 P1-A1/P1-B1
1 CPU & 4 DIMMs	CPU1 P1-A1/P1-B1, P1-C1/P1-D1
2 CPUs & 4 DIMMs	CPU1 + CPU2 P1-A1/P1-B1, P2-E1/P2-F1
2 CPUs & 6 DIMMs	CPU1 + CPU2 P1-A1/P1-B1/P1-C1/P1-D1, P2-E1/P2-F1
2 CPUs & 8 DIMMs	CPU1 + CPU2 P1-A1/P1-B1/P1-C1/P1-D1, P2-E1/P2-F1/P2-G1/P2-H1

RDIMM Support POR				
DIMM Slots per Channel	**DIMMs Populated per DDR Channel**	**RDIMM Type (RDIMM = Registered DIMMs)**	**POR Speeds (in MHz)**	**Ranks per DIMM (Any Combination)**
1	1	Reg. ECC DDR3	800/1066/1333/1600	SR, DR, or QR
2	1	Reg. ECC DDR3	800/1066/1333/1600	SR, DR, or QR
2	2	Reg. ECC DDR3	800/1066/1333/1600	Mixing SR, DR, QR

Population Rules:
1. Any combination of x4 and x8 RDIMMs with 1 Gb or 2 Gb DRAM density are supported.
2. Populate DIMMs starting with DIMM A1.
3. When mixing QR with SR or DR on the same DDR channel, put the QR in DIMMA1 first.

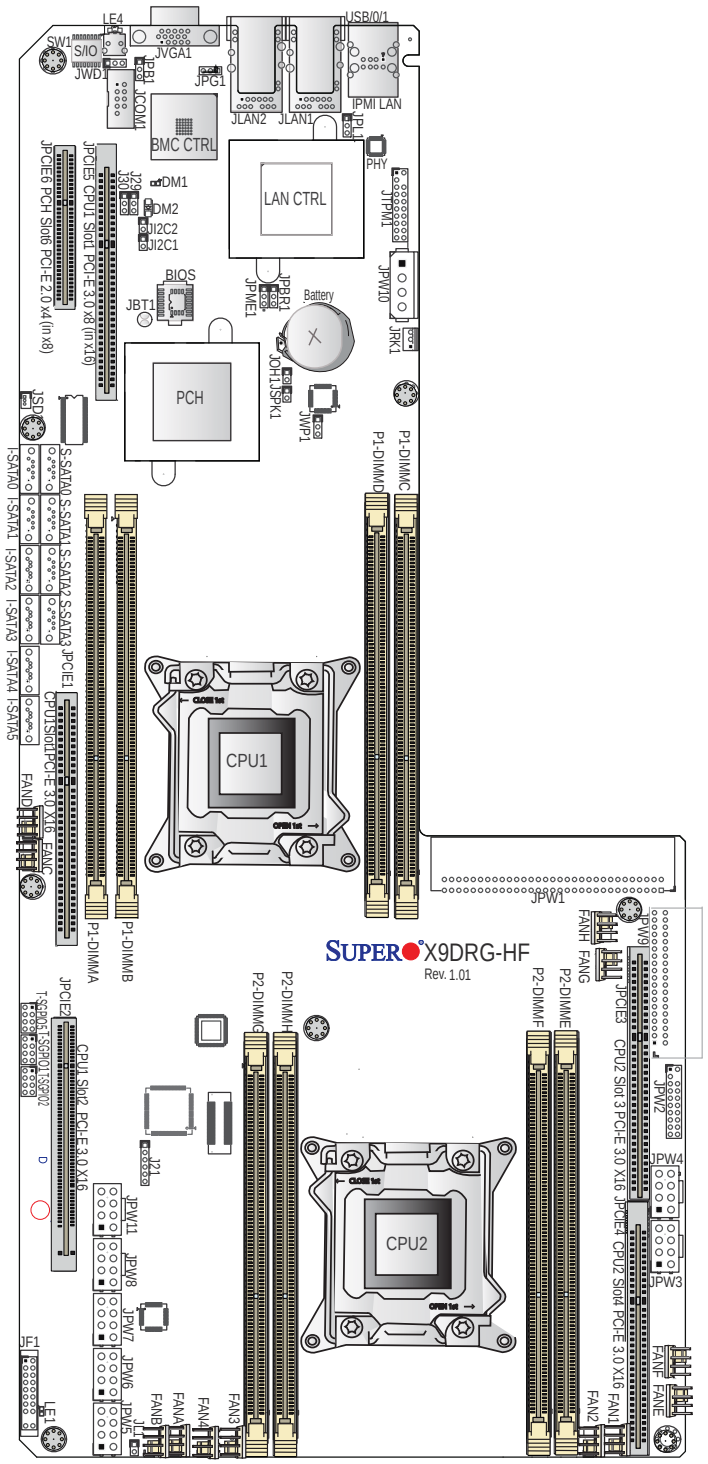
5-6 Expansion Cards

In addition to offering support for three GPU cards, the 1027GR-TRF supports one low-profile PCI-Express 3.0 x8 expansion card (in x16 slot). A riser card is required to support expansion cards.

Refer to Chapter 6 for instructions on installing an expansion card in the system..

5-7 Serverboard Details

Figure 5-5. X9DRG-HF Layout



Notes

Jumpers not indicated are for test purposes only.

"■" indicates the location of Pin 1.

X9DRG-HF Quick Reference

Jumper	Description	Default Setting
JBT1	Clear CMOS	See Section 5-9
JBR1	ME Recovery	Pins 2-3 (Normal)
JPB1	BMC Enable/Disable	Pins 1-2 (Enabled)
JPG1	VGA Enable/Disable	Pins 1-2 (Enabled)
JPL1	LAN1/LAN2 Enable/Disable	Pins 1-2 (Enabled)
JPME1	Manufacture Mode	Pins 2-3 (Normal)
JWD	Watch Dog Timer Enable/Disable	Pins 1-2 (Reset)
JWP1	Write-Protect Enable/Disable	Pins 1-2 (Enabled)

Connector	Description
Battery	Onboard Battery
FAN1 - FAN4	CPU Fans
FANA - FANH	GPU Fans
JCOM1	COM Header for Front Chassis Access
JF1	Control Panel Header
JL1	Chassis Intrusion Header
JOH1	Overheat LED Indicator
JI^{2}C1/JI^{2}C2	Power Supply SMBbus I^{2}C Header
JPW1	Proprietary 62-pin Power Connector
JPW2	Proprietary 20-pin Power Connector
JPW3-8, JPW11	12V 8-pin Power Connectors
JPW9	Proprietary 38-pin Power Connector
JPW10	5V 4-pin Power Connector
JSD1	Power Fail Header
JSPK1	Onboard Speaker Header
JTPM1	TPM (Trusted Platform Module)/Port 80 Header
JRK1	SATA RAID Key Header
JVGA1	Backpanel VGA Port
LAN1/LAN2	LAN Ports 1/2
(IPMI) LAN	IPMI Dedicated LAN

I-SATA 0~5	SATA 3.0 (I-SATA 0/1) and SATA 2.0 Ports (I-SATA 2~5)
S-SATA 0~3	SATA 2.0 Ports (S-SATA 0~3)
PCI Slot 1/Slot 2	PCI-E 3.0 x16 Slots (Available when CPU1 is populated)
PCI Slot 5	PCI-E 3.0 x8 in x16 Slot (Available when CPU1 is populated)
PCI Slot 3/Slot 4	PCI-E 3.0 x16 Slots (Available when CPU2 is populated)
(PCH) PCI Slot 6	PCI-E 2.0 x4 in x8 Slot (Available when CPU2 is populated)
SW1	UID Switch
T-SGPIO 1/2/S	Serial Link General Purpose I/O Headers
USB 0/1	Back Panel USB Ports

LED	Description	State/Status
DM1	BMC Heartbeat LED	Green: BMC Normal
LE1	Standby PWR LED	Green: SB Power On
LE4	UID Switch LED	

Notes:

PCI-E Slot 1, Slot 2 and Slot 5 are controlled by CPU1 and are only available when a processor is installed in CPU Socket 1. PCI-E Slot 3, Slot 4 and Slot 6 are controlled by CPU2 and are available only when a processor is installed in CPU Socket 2.

To provide adequate power supply to the system, be sure to connect all onboard power connectors to the power supply.

5-8 Connector Definitions

Power Connectors

Three SMC-proprietary power connectors are located at JPW1, JPW2 and JPW9 to provide main power to the serverboard. Seven 12V, 8-pin power connectors, located at JPW3-8 and JPW11, are used for SATA devices and GPU cards (JPW5 is for the backplane). An additional 4-pin auxilliary connector is located at JPW10. Connect these power headers as described below.

12V 8-pin Power Connector Pin Definitions

Pins	Definition
1 through 3	+12V
4 through 8	Ground

5V 4-pin Power Connector Pin Definitions

Pins	Definition
1	+12V
2-3	Ground
4	+5V

JPW1: 62-pin SMC-Proprietary (Required)

JPW2: 20-pin SMC-Proprietary (Required)

JPW9: 38-pin SMC-Proprietary (Required)

JPW5: 12V 8-pin for HDD backplane (Required)

JPW3, 4, 6, 7, 8, 11: 12V 8-pin for GPU power

JPW10: 5V 4-pin Auxilliary

Power Button Connector

The PW_ON connector is on pins 1 and 2 of JF1. Momentarily contacting both pins will power on/off the system. This button can also be configured to function as a suspend button (with a setting in the BIOS, see Chapter 7). To turn off the power when set to suspend mode, press the button for at least 4 seconds. Refer to the table on the right for pin definitions. This header should be connected to the chassis power button. See the table on the right for pin definitions.

Power Button Pin Definitions (JF1)

Pin#	Definition
1	Power Button
2	Ground

Reset Connector

The reset connector is located on pins 3 and 4 of JF1 and attaches to the reset switch on the computer chassis. See the table on the right for pin definitions.

Reset Button Pin Definitions (JF1)

Pin#	Definition
3	Reset
4	Ground

Power Fail LED

The Power Fail LED connection is located on pins 5 and 6 of JF1. Refer to the table on the right for pin definitions.

PWR Fail LED Pin Definitions (JF1)

Pin#	Definition
5	3.3V
6	PWR Fail LED

Overheat/Fan Fail/UID LED

Connect an LED cable to pins 7 and 8 of JF1 for the Overheat/Fan Fail and UID LED connections. The red LED (pin 8) provides warning of an overheat or fan failure. The blue LED (pin 7) works as the UID LED indicator for the front panel UID button located on pins 13~14 of JF1. When Jumper J_UID_OW is set to off (default), the red LED takes precedence over the blue LED. Refer to the tables on the right for more information.

OH/Fan Fail/Blue_UID LED Pin Definitions (JF1)

Pin#	Definition
7	Blue_LED-Cathode(UID)/5.5V.SB
8	OH/Fan Fail/UID LED (Red)

OH/Fan Fail LED Status (Red LED)

State	Definition
Off	Normal
On	Overheat
Flashing	Fan Fail

NIC2 (LAN2) LED

The LED connections for LAN2 are on pins 9 and 10 of JF1. Attach an LED cable to display network activity. See the table on the right for pin definitions.

NIC2 LED Pin Definitions (JF1)

Pin#	Definition
9	Activity LED
10	Link LED

NIC1 (LAN1) LED

The LED connections for LAN1 are on pins 11 and 12 of JF1. Attach an LED cable to display network activity. See the table on the right for pin definitions.

NIC1 LED Pin Definitions (JF1)

Pin#	Definition
11	Activity LED
12	Link LED

HDD/FP UID Button

The HDD/UID button connections are located on pins 13/14 of JF1. Attach a hard-drive LED cable to display HDD or SATA activity. This connection can also be used for the front panel UID (Unit Identifier) button. (The UID LED on pin 7 of JF1 works in conjunction with the UID button.) When the user presses and releases the UID button, the UID LED will be turned on or off to indicate the location of the unit in a stack or rackmounted servers.

HDD/UID LED Pin Definitions (JF1)

Pin#	Definition
13	UID Signal/3.3V
14	HDD Activity

Power On LED

The Power On LED connector is located on pins 15 and 16 of JF1. This connection is used to provide LED indication of power being supplied to the system. See the table on the right for pin definitions.

Power LED Pin Definitions (JF1)

Pin#	Definition
15	+3.3V
16	Control

Fan Headers

The X9DRG-HF has twelve fan headers. Fans 1~4 are for CPU/system use and Fans A~H for GPU use.. All are 4-pin fan headers, which are backward compatible with traditional 3-pin fans. However, fan speed control is available for 4-pin fans only. See the table on the right for pin definitions.

Fan Header Pin Definitions

Pin#	Definition
1	Ground
2	+12V
3	Tachometer
4	Pulse Width Modulation

Serial Ports

A COM Port (COM1) is located next to the UID switch to provide serial port support. See the table on the right for pin definitions.

Serial Port Pin Definitions

Pin #	Definition	Pin #	Definition
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	Ground	10	NC

NMI Header

The non-maskable interrupt header is located at JNMI1. Refer to the table on the right for pin definitions.

NMI Button Pin Definitions

Pin#	Definition
1	Control
2	Ground

Internal Buzzer

The Speaker header, located at JSPK1, can be used to provide audible alarms for various beep codes. See the table on the right for pin definitions.

Internal Buzzer Pin Definitions

Pin#	Definitions	
Pin 1	Pos. (+)	5V
Pin 2	Neg. (-)	Alarm Speaker

Chassis Intrusion

A Chassis Intrusion header is located at JL1 on the serverboard. Attach an appropriate cable from the chassis to inform you of a chassis intrusion when the chassis is opened.

Chassis Intrusion Pin Definitions

Pin#	Definition
1	Intrusion Input
2	Ground

T-SGPIO Headers

Three SGPIO (Serial-Link General Purpose Input/Output) headers are provided on the serverboard. These headers support serial link interfaces for the onboard SATA ports. See the table on the right for pin definitions.

T-SGPIO Pin Definitions

Pin#	Definition	Pin	Definition
1	NC	2	NC
3	Ground	4	Data
5	Load	6	Ground
7	Clock	8	NC

NC = No Connection

RAIDKey Header

A RAIDKey header (JRK1) provides RAID function support to enhance system performance.

RAIDKey Pin Definitions

Pin#	Definition
1	Ground
2	Signal
3	Ground

TPM Header/Port 80

A Trusted Platform Module/Port 80 header is located at JTPM1 to provide TPM and Port 80 support, which will enhance system performance and data security. See the table on the right for pin definitions.

TPM/Port 80 Header Pin Definitions

Pin#	Definition	Pin #	Definition
1	LCLK	2	GND
3	LFRAME#	4	<(KEY)>
5	LRESET#	6	NC
7	LAD 3	8	LAD 2
9	+3.3V	10	LAD1
11	LAD0	12	GND
13	NC	14	NC
15	+3V_DUAL	16	SERIRQ
17	GND	18	CLKRUN# (X)
19	LPCPD#	20	NC

Universal Serial Bus (USB)

Two Universal Serial Bus ports (USB0/1) are located on the I/O backplane. Connect USB devices to these ports.

USB Pin Definitions

Pin#	Definition
1	+5V
2	PO-
3	PO+
4	Ground
5	NA

Ethernet Ports

Two Ethernet ports are located next to the USB 0/1 on the IO backplane. In addition, an IPMI Dedicated LAN is located above the USB ports 0/1. These ports accept RJ45 type cables.

Note: Please refer to the LED Indicator Section for LAN LED information.

LAN Ports Pin Definition

Pin#	Definition	Pin#	Definitions
1	TD0+	11	TD3-
2	TD0-	12	PIV8_NIC
3	PIV8_NIC	13	ACT LED-
4	TD1+	14	ACT LED+
5	TD1-	15	Link 100 LED (Green)
6	PIV8_NIC	16	Link 1000 LED (Yellow)
7	TD2+	17	Ground
8	TD2-	18	Ground
9	PIV8_NIC	19	Ground
10	TD3+	20	Ground

Unit Identifier Switch

A Unit Identifier (UID) switch and two LED indicators are provided on the serverboard. The rear UID LED (LE4) is located next to the rear UID switch. The front panel UID LED is on pins 7/8 of JF1. Connect a cable to pins 7/8 on JF1 for front panel UID indication. Pressing the UID switch will turn on both the rear and front UID LEDs. Pressing the UID switch again will turn off both LEDs. These UIDs provide easy identification of a system unit that may be in need of service.

Note: the UID can also be triggered via IPMI. Please refer to the IPMI User's Guide posted on our Website.

UID LED (LE4) Status

Color/State	OS Status	
Blue: On	Windows OS	Unit Identified
Blue: Blinking	Linux OS	Unit Identified

UID Switch

Pin#	Definition
1	Button In
2	Ground
3	Ground
4	Ground

Overheat LED/Fan Fail

The JOH1 header is used to connect an LED indicator to provide warnings of chassis overheating and fan failure. This LED will blink when a fan failure occurs. Refer to the tables on right for pin definitions.

Overheat LED Pin Definitions

Pin#	Definition
1	5vDC
2	OH Active

OH/Fan Fail LED Status

State	Message
Solid	Overheat
Blinking	Fan Fail

Power SMB (I^2C) Connectors

Power System Management Bus (I^2C) Connectors (JI^2C1/JI^2C2) monitor power supply, fan and system temperatures. See the table on the right for pin definitions.

PWR SMB Pin Definitions

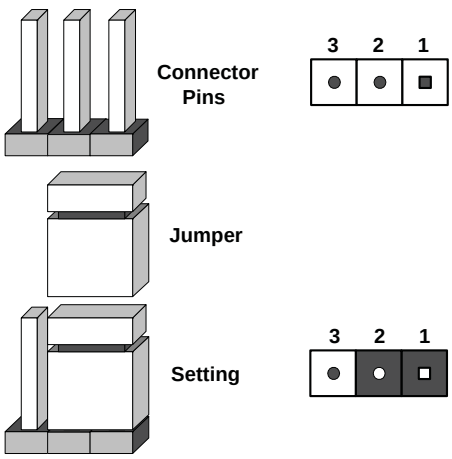
Pin#	Definition
1	Clock
2	Data
3	PWR Fail
4	Ground
5	+3.3V

5-9 Jumper Settings

Explanation of Jumpers

To modify the operation of the serverboard, jumpers can be used to choose between optional settings. Jumpers create shorts between two pins to change the function of the connector. Pin 1 is identified with a square solder pad on the printed circuit board. See the serverboard layout pages for jumper locations.

Note: On a two-pin jumper, "Closed" means the jumper is on both pins and "Open" means the jumper is either on only one pin or completely removed.



CMOS Clear

JBT1 is used to clear CMOS (which will also clear any passwords). Instead of pins, this jumper consists of contact pads to prevent accidentally clearing the contents of CMOS.

To clear CMOS,

1. First power down the system and unplug the power cord(s).
2. With the power disconnected, short the CMOS pads with a metal object such as a small screwdriver.
3. Remove the screwdriver (or shorting device).
4. Reconnect the power cord(s) and power on the system.

Note: *Do not use the PW_ON connector to clear CMOS*.

VGA Enable/Disable

JPG1 allows you to enable or disable the VGA port. The default position is on pins 1 and 2 to enable VGA. See the table on the right for jumper settings.

VGA Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

LAN1/2 Enable/Disable

Change the setting of jumper JPL1 to enable or disable the LAN1/LAN2 Ethernet ports on the serverboard. See the table on the right for jumper settings. The default setting is enabled.

LAN1/2 Enable/Disable Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

Watch Dog Enable/Disable

JWD controls the Watch Dog function. Watch Dog is a system monitor that can reboot the system when a software application hangs. Jumping pins 1-2 (default) will cause WD to reset the system if an application hangs. Jumping pins 2-3 will generate a non-maskable interrupt signal for the application that hangs. See the table on the right for jumper settings. Watch Dog must also be enabled in BIOS.

Note: When enabled, the user needs to write their own application software in order to disable the Watch Dog Timer.

Watch Dog Jumper Settings	
Jumper Setting	Definition
Pins 1-2	Reset
Pins 2-3	NMI
Open	Disabled

Manufacturer Mode Select

Close jumper JPME1 to bypass SPI flash security and force the system to use the Manufacturer Mode, which will allow the user to flash the system firmware from a host server to modify system settings. See the table on the right for jumper settings.

ME Mode Select Jumper Settings	
Jumper Setting	Definition
1-2	Manufacture Mode
2-3	Normal (Default)

Write Protect Enable

Close pins 1/2 of jumper JWP1 to enable Write Protect support for system security and data integrity. See the table on the right for jumper settings.

Write Protect Jumper Settings	
Jumper Setting	Definition
Pins 1/2	Write_Protect Enable (Default)
Pins 2/3	Write_Protect Disable

BMC Enable/Disable

Use jumper JPB1 to enable or disable the BMC (Baseboard Management Controller), which supports IPMI 2.0/KVM. See the table on the right for jumper settings.

BMC Enable/Disable Jumper Settings	
Both Jumpers	Definition
Pins 1-2	Enabled
Pins 2-3	Disabled

5-10 Onboard Indicators

LAN1/2 Port LEDs

The Ethernet ports have two LEDs. On each port, one LED indicates activity while the other LED may be green, amber or off to indicate the speed of the connection. See the table on the right for the functions associated with the connection speed LED.

Note: the dedicated IPMI LAN does not operate at 1 Gb/s.

LAN1/2 LED (Connection Speed Indicator)	
LED Color	Definition
Off	No connection or 10 Mb/s
Green	100 Mb/s
Amber	1 Gb/s

Dedicated IPMI LAN Port LEDs

A dedicated IPMI LAN port is also located on the I/O backplane. The amber LED on the right indicates activity, while the green LED on the left indicates the speed of the connection. Please note that the IPMI LAN does not support 1Gbps connections. See the table at right for more information.

IPMI LAN LEDs		
	Color/State	Definition
Link (Left)	Green: Solid	100 Mbps
Activity (Right)	Amber: Blinking	Active

Onboard Power LED

An Onboard Power LED is located at LE1. This LED Indicator is on when the system is on. Be sure to unplug the AC power cable before removing or adding any components. See the table on the right for more details.

Onboard PWR LED Indicator	
LED Color	Definition
Off	System Off (power cable not connected)
Green	System On
Green: Flashing Quickly	ACPI S1 State

ME Recovery

JBR1 is used for ME Firmware Recovery mode, which will limit system resource for essential function use only without putting restrictions on power use. In the single operation mode, online upgrade will be available via Recovery mode. See the table on the right for jumper settings.

ME Recovery Select Jumper Settings

Jumper Setting	Definition
1-2	Manufacture Mode
2-3	Normal (Default)

BMC Heartbeat LED

The BMC Heartbeat LED is designated DM1. When DM1 is blinking, the BMC (Baseboard Management Controller) is functioning normally. See the table at right for more information.

BMC Heatbeat LED Indicator LED Status

Green: Blinking	BMC: Normal

Rear UID LED

The rear UID LED is located at LE4 on the backplane. This LED is used in conjunction with the rear UID switch to provide easy identification of a system that might be in need of service.

UID LED Status

Color/State	OS Status	
Blue: On	Windows OS	Unit Identified
Blue: Blinking	Linux OS	Unit Identified

5-11 SATA Ports

SATA Ports

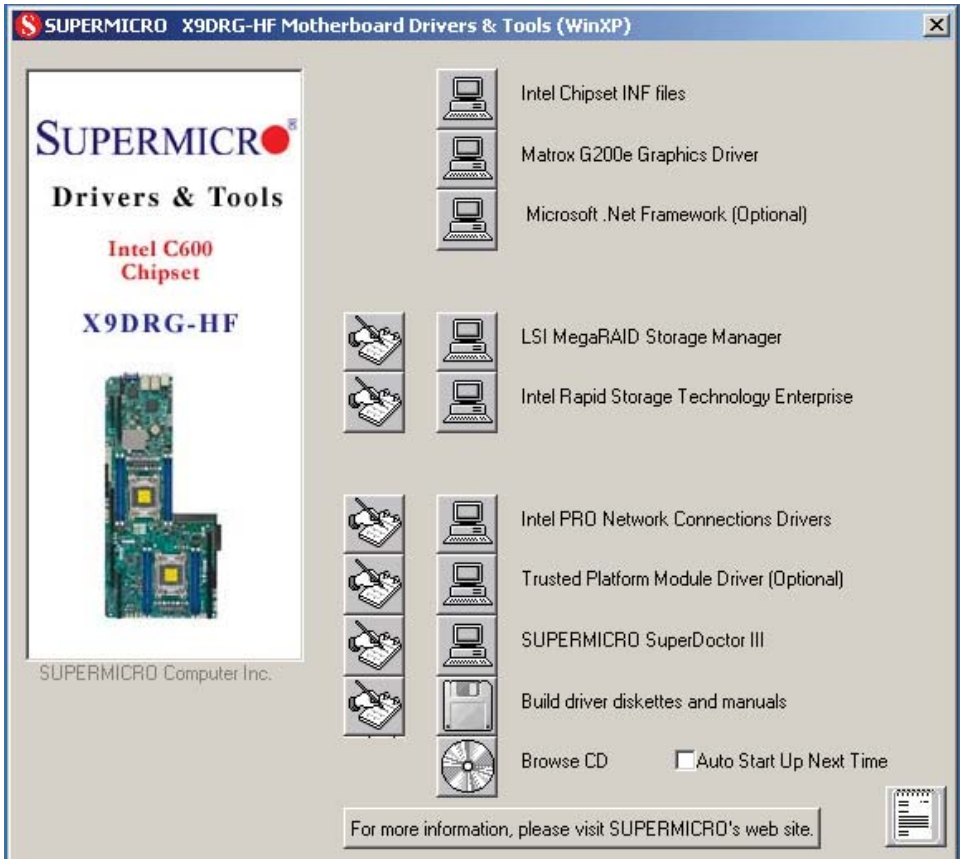
Two SATA 3.0 ports (I-SATA0 and I-SATA1) and eight SATA 2.0 ports (I-SATA2 through I-SATA5 and S-SATA0 through S-SATA3) are included on the serverboard. There are no jumpers to configure the onboard SATA ports. See the table on the right for pin definitions.

SATA Port Pin Definitions

Pin #	Definition
1	Ground
2	TXP
3	TXN
4	Ground
5	RXN
6	RXP
7	Ground

5-12 Installing Software

After the hardware has been installed, you should first install the operating system and then the drivers. The necessary drivers are all included on the Supermicro CDs that came packaged with your system.



Driver/Tool Installation Display Screen

Note: Click the icons showing a hand writing on paper to view the readme files for each item. Click the computer icons to the right of these items to install each item (from top to the bottom) one at a time. **After installing each item, you must re-boot the system before moving on to the next item on the list.** The bottom icon with a CD on it allows you to view the entire contents of the CD.

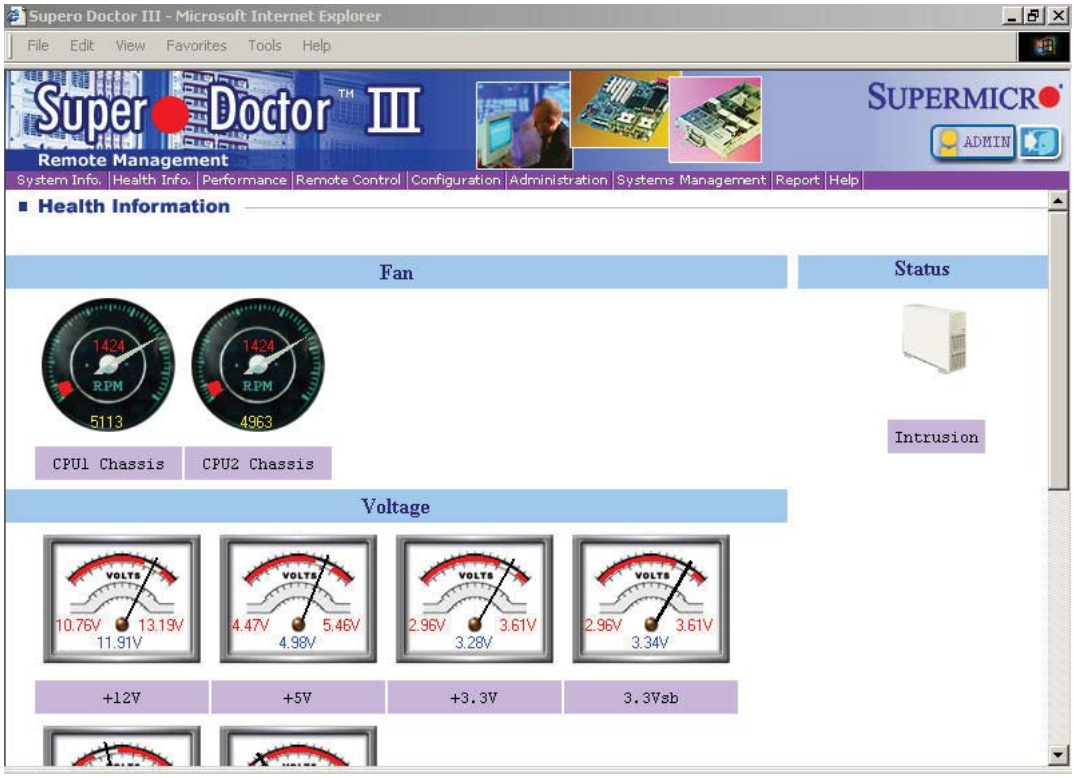
Supero Doctor III

The Supero Doctor III program is a web-based management tool that supports remote management capability. It includes Remote and Local Management tools. The local management is called SD III Client. The Supero Doctor III program included on the CD-ROM that came with your serverboard allows you to monitor the environment and operations of your system. Supero Doctor III displays crucial system information such as CPU temperature, system voltages and fan status. See the Figure below for a display of the Supero Doctor III interface.

Note: The default User Name and Password for SuperDoctor III is ADMIN / ADMIN.

Note: When SuperDoctor III is first installed, it adopts the temperature threshold settings that have been set in BIOS. Any subsequent changes to these thresholds must be made within Super Doctor, as the Super Doctor settings override the BIOS settings. To set the BIOS temperature threshold settings again, you would first need to uninstall SuperDoctor III.

Supero Doctor III Interface Display Screen (Health Information)



Supero Doctor III Interface Display Screen (Remote Control)

Note: SD III Software Revision 1.0 can be downloaded from our Web Site at: ftp://ftp.supermicro.com/utility/Supero_Doctor_III/. You can also download the SDIII User's Guide at: http://www.supermicro.com/manuals/other/SDIII_User_Guide.pdf. For Linux, we will recommend using Supero Doctor II.

Notes

Chapter 6

Advanced Chassis Setup

This chapter covers the steps required to install components and perform maintenance on the SC118GQ chassis. For component installation, follow the steps in the order given to eliminate the most common problems encountered. If some steps are unnecessary, skip ahead to the next step.

Tools Required: The only tool you will need to install components and perform maintenance is a Philips screwdriver.

6-1 Static-Sensitive Devices

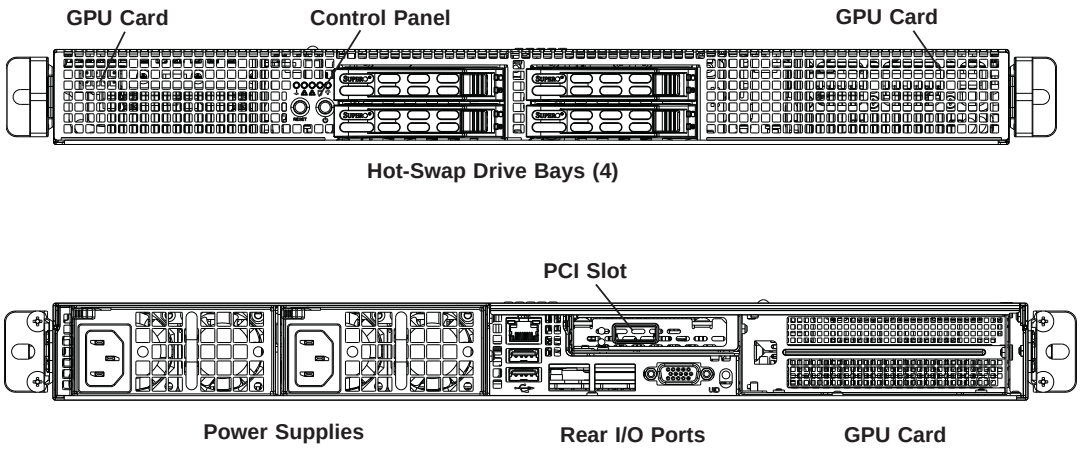
Electrostatic Discharge (ESD) can damage electronic components. To prevent damage to any printed circuit boards (PCBs), it is important to handle them very carefully.

The following measures are generally sufficient to protect your equipment from ESD damage.

Precautions

- Use a grounded wrist strap designed to prevent static discharge.
- Touch a grounded metal object before removing any board from its antistatic bag.
- Handle a board by its edges only; do not touch its components, peripheral chips, memory modules or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the serverboard, add-on cards and peripherals back into their antistatic bags when not in use.
- For grounding purposes, make sure your computer chassis provides excellent conductivity between the power supply, the case, the mounting fasteners and the serverboard.

Figure 6-1. Chassis: Front and Rear Views



Note: the number of PCI slots available depends on the presence of GPUs in the server model.

6-2 Control Panel

The control panel (located on the front of the chassis) must be connected to the JF1 connector on the serverboard to provide you with system status indications. A ribbon cable has bundled these wires together to simplify the connection. Connect the cable from JF1 on the serverboard to the appropriate header on the Control Panel PCB (printed circuit board). Make sure the red wire plugs into pin 1 on both connectors. Pull all excess cabling out of the airflow path.

The control panel LEDs inform you of system status. See "Chapter 3: System Interface" for details on the LEDs and the control panel buttons. Details on JF1 can be found in "Chapter 5: Advanced Serverboard Installation."

6-3 System Cooling

Ten 4-cm counter-rotating fans provide the cooling for the system. Each fan unit is actually made up of two fans joined back-to-back, which rotate in opposite directions. This counter-rotating action generates exceptional airflow and works to dampen vibration levels.

It is very important that the chassis top cover is properly installed and making a good seal in order for the cooling air to circulate properly through the chassis and cool the components.

System Fan Failure

Fan speed is controlled by system temperature via a BIOS setting. If a fan fails, the remaining fans will ramp up to full speed. Replace any failed fan at your earliest convenience with the same type and model (the system can continue to run with a failed fan). Failed fans can be identified through the BIOS. (See the fan numbering in Figure 6-3. These numbers are also imprinted on the floor of the chassis.)

Replacing a System Fan

1. If the BIOS is not being utilized to determine which fan has failed, open the top cover of the chassis while the system is running to locate the position of the failed fan. Never run the server for an extended period of time with the top cover open.

2. Turn off the power to the system and unplug the AC power cord.

3. Remove the failed fan's wiring from the serverboard.

4. Remove the four pins securing the fan to the fan tray.

5. Lift the failed fan from the fan tray and out of the chassis.

6. Place the new fan into the vacant space in the fan tray, while making sure the arrows on the top of the fan (indicating air direction) point in the same direction as the arrows on the other fans in the same fan tray.

7. Reconnect the fan wires to the exact same chassis fan headers as the previous fan.

8. Reconnect the AC power cord, power up the system and check that the fan is working properly before replacing the chassis cover.

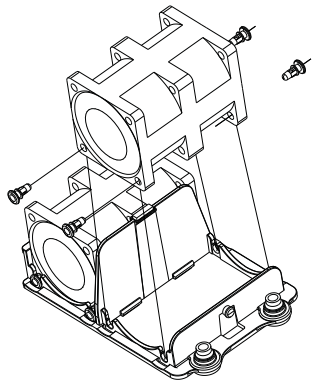


Figure 6-2. Removing a Fan from the Fan Tray

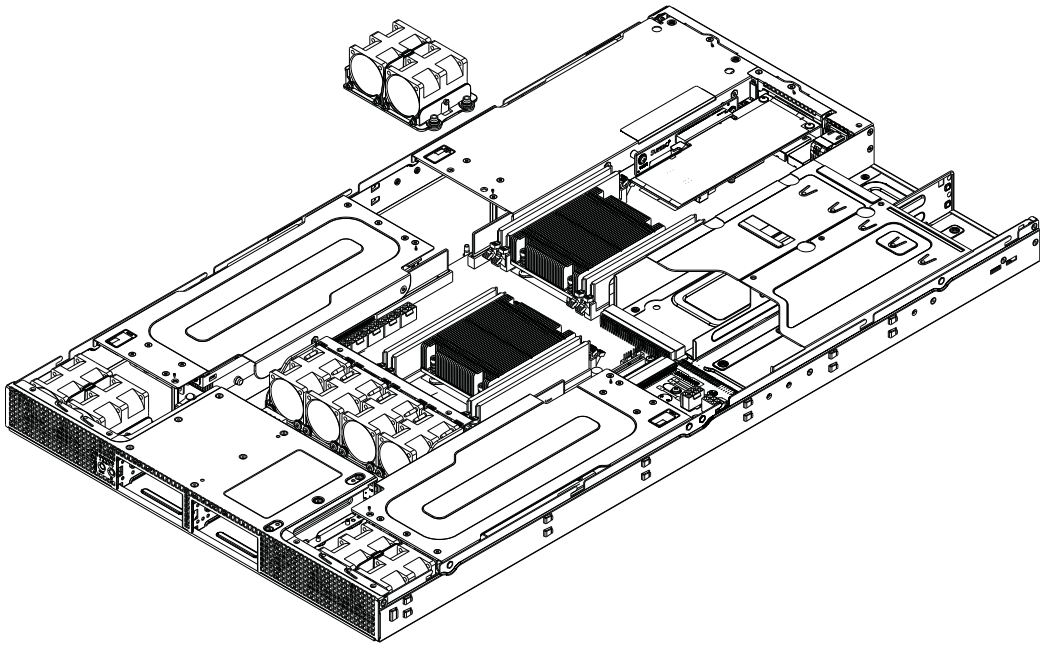


Figure 6-3: Installing a Fan

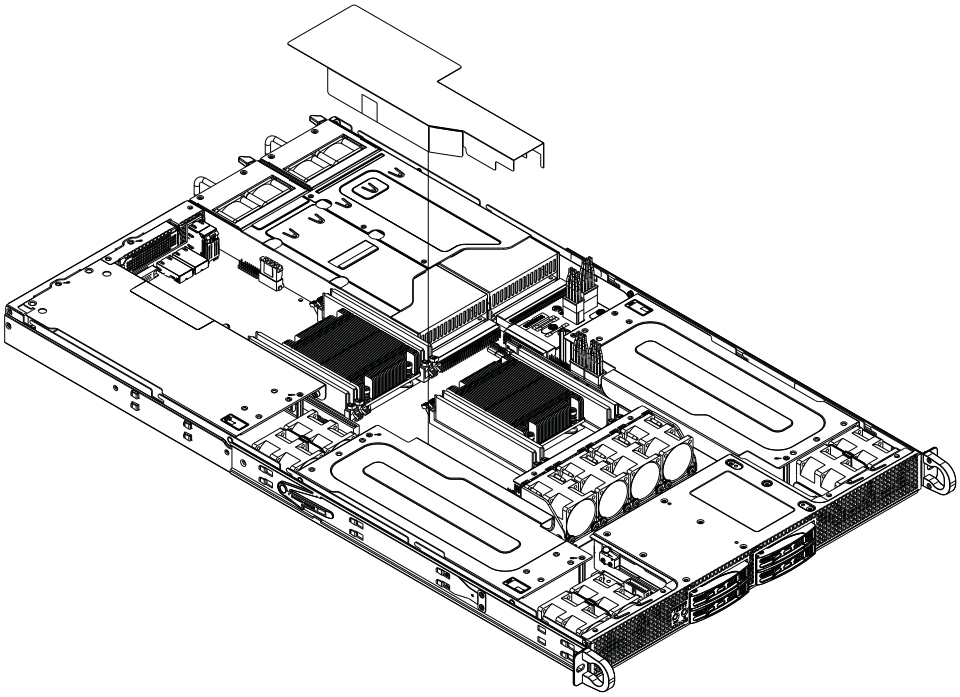


Figure 6-4: Installing the Air Shroud

Installing the Air Shroud

Air shrouds concentrate airflow to maximize fan efficiency. The SC118GQ chassis air shroud does not require screws to set up

Note: Each GPU card has its own air shroud.

Installing the Air Shroud

1. Position the air shroud in the chassis as illustrated in Figure 6-4.
2. Align the notch on the air shroud with the pin on the add-on card bracket.
3. Slide the pin into the back of the notch.
4. Lower the front of the air shroud over the fan tray, sliding the front notches over the pins on the fan tray.

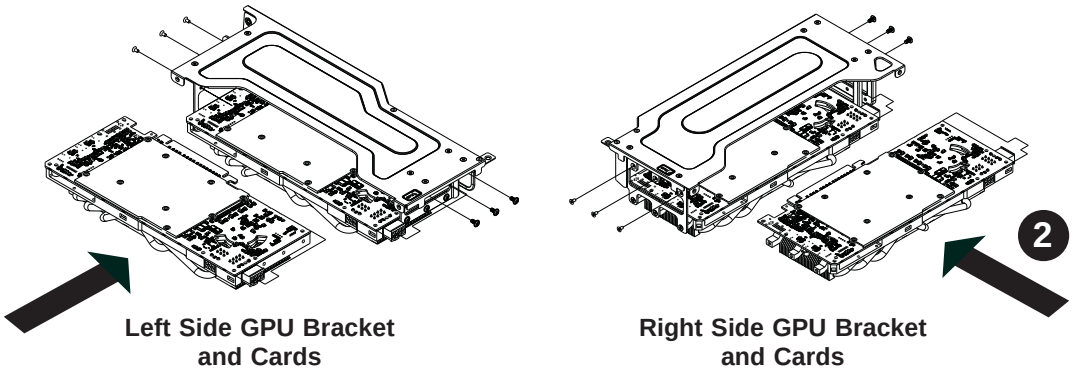
Installing Graphics (GPU) Cards

The SC118G chassis supports three GPU cards, which are mounted in brackets to fit into the PCI-E 3.0 slots. Supported GPU cards include NVIDIA M2090 and M2075. The GPU cards may be preinstalled, the procedure below is provided for when a GPU card need to be replaced.

Installing Graphics Cards

1. Identify the left and right brackets and graphics cards as illustrated below.
2. Insert the graphics cards into the brackets, aligning the mounting holes in the graphics cards with the mounting holes in the brackets.
3. Secure each card to the bracket using the six screws which are included for this purpose.
4. Carefullly position each bracket in the chassis, aligning the four mounting holes in the top and side of each bracket with the corresponding mounting holes in the chassis.
5. Secure the bracket to the chassis by using the screws provided.
6. After a GPU card is installed, you must connect it to one of the following power headers on the serverboard: JPW3, JPW4, JPW6, JPW7, JPW8 or JPW11..

Figure 6-5. Installing GPU Cards into the Left and Right GPU Brackets



6-4 Drive Bay Installation/Removal

Accessing the Drive Bays

Because of their hotswap capability, you do not need to access the inside of the chassis or power down the system to install or replace hard drives. Proceed to the next section for instructions.

Hard Drive Installation

The hard drives are mounted in drive carriers to simplify their installation and removal from the chassis. These carriers also help promote proper airflow for the drive bays. For this reason, even empty carriers without drives installed must remain in the chassis.

Removing Hard Drive Carriers from the Chassis

1. Press the release button on the drive carrier. This extends the drive carrier handle.
2. Use the handle to pull the drive carrier out of the chassis.

Installing a Hard Drive into a Drive Carrier

1. Remove the dummy drive, which comes pre-installed in the drive carrier, by removing the screws securing the dummy drive to the carrier. Note that these screws cannot be reused on the actual 2.5" hard drive.

2. Insert a drive into the carrier with the PCB side facing down and the connector end toward the rear of the carrier.

3. Align the drive in the carrier so that the screw holes of both line up. Note that there are holes in the carrier marked “SATA” to aid in correct installation.

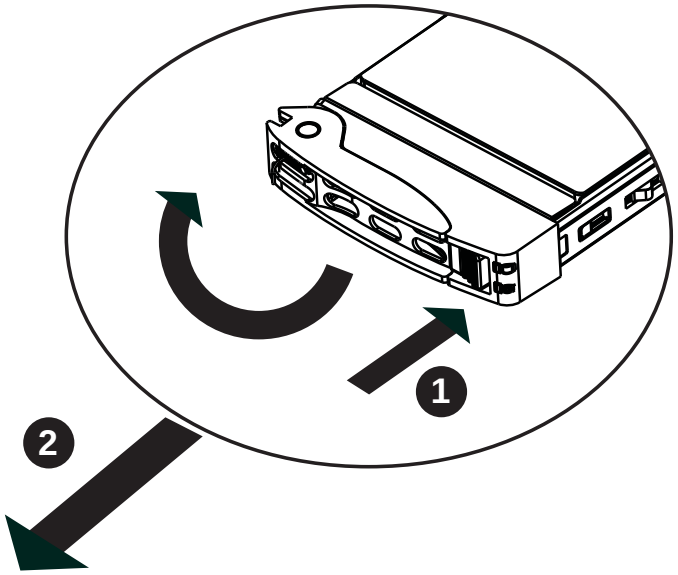
4. Secure the drive to the carrier with four M3 screws as illustrated below. These screws are included in the chassis accessory box.

5. Insert the drive carrier into its bay, keeping the carrier oriented so that the hard drive is on the top of the carrier and the release button is on the right side. When the carrier reaches the rear of the bay, the release handle will retract.

6. Push the handle in until it clicks into its locked position

Warning: Except for short periods of time (swapping hard drives), do not operate the server with the hard drive carriers removed.

Figure 6-6. Removing a Hard Drive Carrier



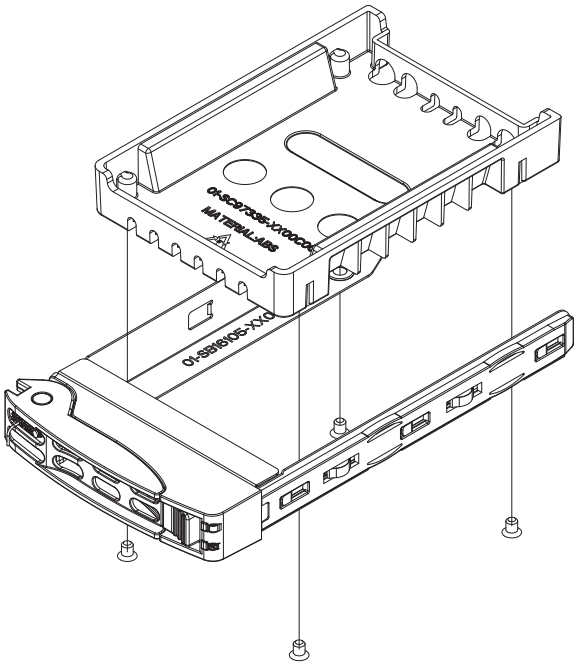


Figure 6-7. Installing a Hard Drive into a Carrier

Enterprise level hard disk drives are recommended for use in Supermicro chassis and servers. For information on recommended HDDs, visit the Supermicro Web site at http://www.supermicro.com/products/nfo/storage.cfm

6-5 Power Supply

The 1027GR-TRF series server includes an 1800 watt redundant power supply consisting of two power modules. Each power supply module has an auto-switching capability, which enables it to automatically sense and operate at a 100V - 240V input voltage.

If either of the two power supply modules fail, the other module will take the full load and allow the system to continue operation without interruption.

Replacement units can be ordered directly from Supermicro. The power supply units have a hot-swap capability, meaning you can replace the failed unit without powering down the system.

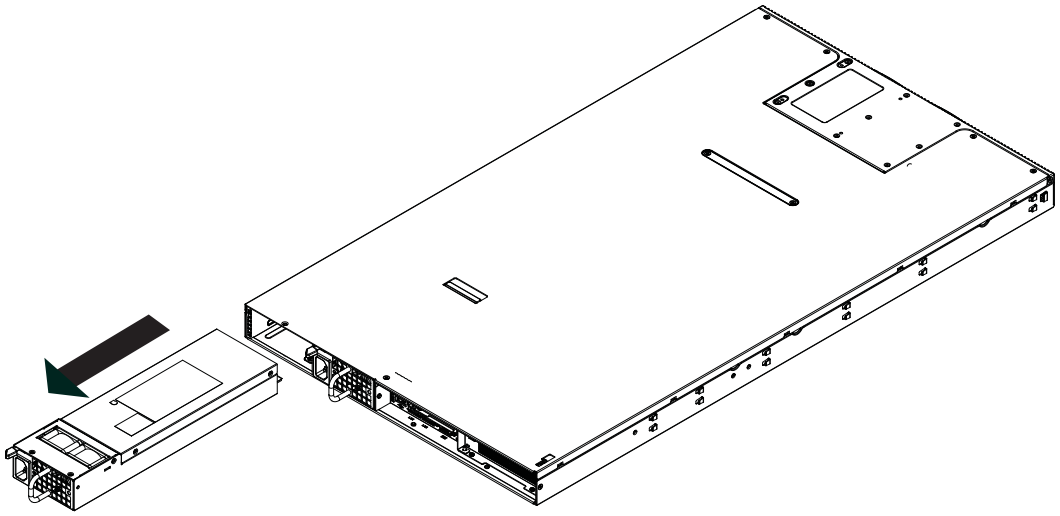


Figure 6-8. Removing the Power Supply

Replacing the Power Supply

1. First unplug the AC power cord from the failed power supply module.
2. To remove the failed power unit, remove the screws on the back of the power supply, which secure it to the chassis. You can then pull the unit straight out of the chassis.
3. Replace the failed unit with another of the exact same power supply.
4. Carefully insert the new unit into position in the chassis and secure it with the screws at the rear of the unit.
5. Reconnect the power cord.

Notes

Chapter 7

BIOS

7-1 Introduction

This chapter describes the AMI BIOS Setup Utility for the X9DRG-HF. The AMI ROM BIOS is stored in a Flash EEPROM and can be easily updated. This chapter describes the basic navigation of the AMI BIOS Setup Utility setup screens.

Starting BIOS Setup Utility

To enter the AMI BIOS Setup Utility screens, press the <Delete> key while the system is booting up.

Note: In most cases, the <Delete> key is used to invoke the AMI BIOS setup screen. There are a few cases when other keys are used, such as <F1>, <F2>, etc.

Each main BIOS menu option is described in this manual. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. Grayed-out options cannot be configured. Options in blue can be configured by the user. The right frame displays the key legend. Above the key legend is an area reserved for text messages. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it. (**Note**: AMI BIOS has default text messages built in. Supermicro retains the option to include, omit, or change any of these text messages.)

The AMI BIOS Setup Utility uses a key-based navigation system called "hot keys." Most of the AMI BIOS setup utility "hot keys" can be used at any time during the setup navigation process. These keys include <F1>, <F10>, <Enter>, <ESC>, arrow keys, etc.

Note: Options printed in **Bold** are default settings.

How To Change the Configuration Data

The configuration data that determines the system parameters may be changed by entering the AMI BIOS Setup utility. This Setup utility can be accessed by pressing <Del> at the appropriate time during system boot.

Note: For AMI BIOS Recovery, please refer to the AMI BIOS Recovery Instructions posted on our Website at http://www.supermicro.com/support/manuals/.

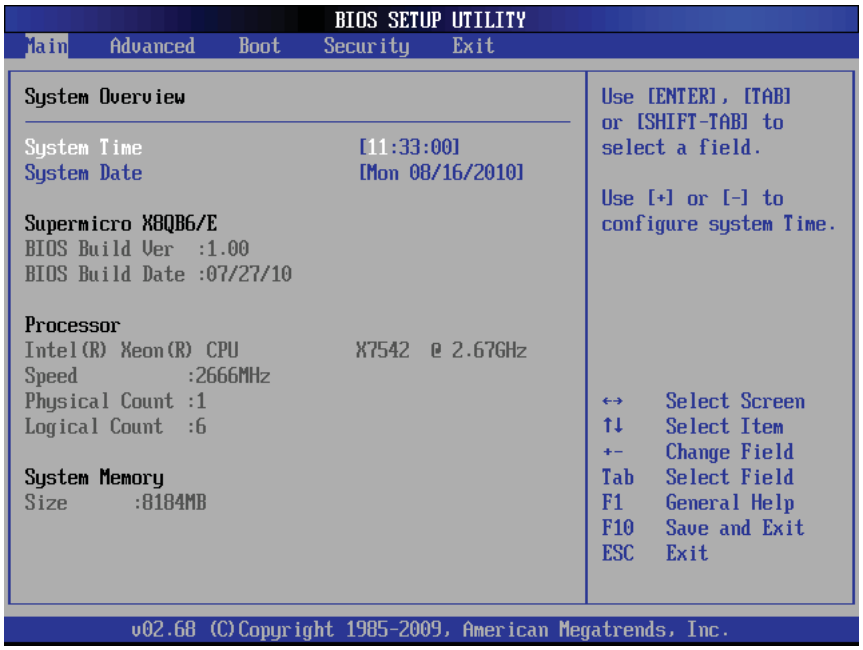
Starting the Setup Utility

Normally, the only visible Power-On Self-Test (POST) routine is the memory test. As the memory is being tested, press the <Delete> key to enter the main menu of the AMI BIOS Setup Utility. From the main menu, you can access the other setup screens. An AMI BIOS identification string is displayed at the left bottom corner of the screen below the copyright message.

Warning! Do not upgrade the BIOS unless your system has a BIOS-related issue. Flashing the wrong BIOS can cause irreparable damage to the system. In no event shall Supermicro be liable for direct, indirect, special, incidental, or consequential damages arising from a BIOS update. If you have to update the BIOS, do not shut down or reset the system while the BIOS is updating to avoid possible boot failure.

7-2 Main Setup

When you first enter the AMI BIOS Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab on the top of the screen. The Main BIOS Setup screen is shown below.



System Overview: The following BIOS information will be displayed:

System Time/System Date

Use this option to change the system time and date. Highlight *System Time* or *System Date* using the arrow keys. Enter new values through the keyboard and press <Enter>. Press the <Tab> key to move between fields. The date must be entered in Day MM/DD/YY format. The time is entered in HH:MM:SS format. (**Note:** The time is in the 24-hour format. For example, 5:30 P.M. appears as 17:30:00.)

Supermicro X8QB6/E

- **BIOS Version**: This item displays the BIOS vision used in your system.
- **BIOS Build Date**: This item displays the date when this BIOS was built.

Processor

The AMI BIOS will automatically display the status of the processor used in your system:

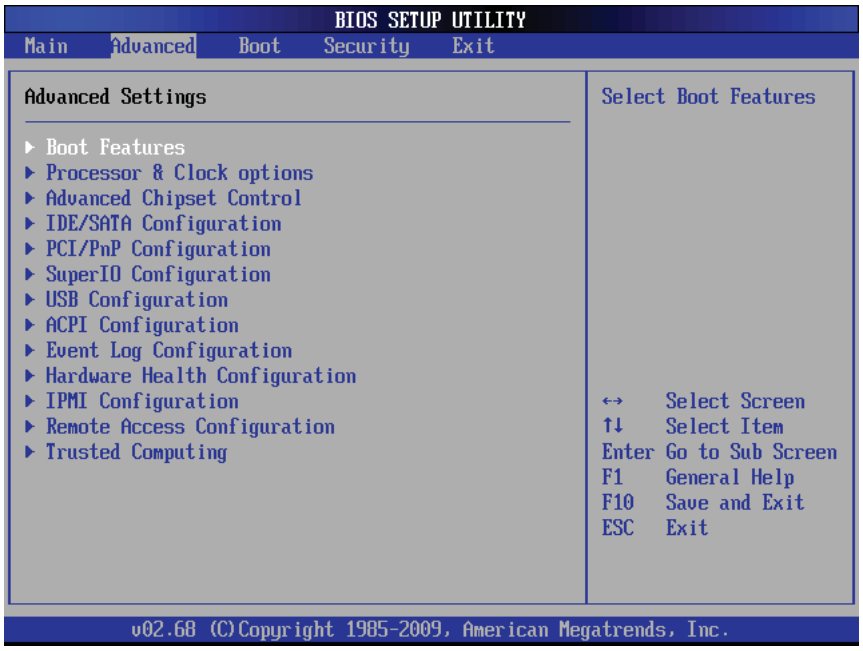
- **CPU Type**: This item displays the type of CPU used in the motherboard.
- **Speed**: This item displays the CPU speed as detected by the BIOS.
- **Physical Count**: This item displays the number of processors installed in your system as detected by BIOS.
- **Logical Count**: This item displays the number of CPU Cores detected in your system by BIOS.

System Memory

- **Size**: This displays the size of memory available in the system.

7-3 Advanced Setup Configurations

Use the arrow keys to select Advanced Settings and press <Enter> to access the submenu items.



Warning: Be sure to select the correct setting for each item in this section. A wrong setting selected may cause the system to malfunction.

▶Boot Features

Quick Boot

If enabled, this feature will skip certain tests during POST to reduce the time needed for system boot. The options are **Enabled** and Disabled.

Quiet Boot

Use this feature to select the bootup screen display between POST messages or the OEM logo. Select Disabled to display the POST messages. Select Enabled to display the OEM logo instead of the normal POST messages. The options are **Enabled** and Disabled.

AddOn ROM Display Mode

This feature sets the display mode for the Option ROM. The options are **Force BIOS** and Keep Current.

Bootup Num-Lock

This feature is used to select the Power-on state for the Numlock key. The options are Off and **On**.

PS/2 Mouse Support

Select Enabled to enable PS/2 Mouse support. Select **Auto** to enable the onboard PS/2 mouse when a PS/2 mouse is detected. The options are Enable, Disabled, and **Auto**.

Wait For 'F1' If Error

This forces the system to wait until the 'F1' key is pressed when an error occurs. The options are Disabled and **Enabled**.

Hit 'Del' Message Display

Select Enabled to display "Press DEL to run Setup" during POST. The options are **Enabled** and Disabled.

Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles boot disk functions. When this item is set to Enabled, the ROM BIOS of the host adaptors will "capture" Interrupt 19 at bootup and allow the drives that are attached to these host adaptors to function as bootable disks. If this item is set to Disabled, the ROM BIOS of the host adaptors will not capture Interrupt 19, and the drives attached to these adaptors will not function as bootable devices. The options are **Enabled** and Disabled.

Watch Dog Function

If enabled, the Watch Dog Timer will allow the system to reboot when it is inactive for more than 5 minutes. The options are Enabled and **Disabled.**

▶Processor and Clock Options

This submenu displays the status of the processor used in the motherboard and allows the user to configure the Processor and Clock settings.

Spread Spectrum Mode

Select Enable to enable Clock Spectrum modulation support, which will allow BIOS to monitor and attempt to reduce the level of Electromagnetic Interference caused by the components whenever needed. The options are **Disabled** and Enabled.

Ratio CMOS Setting (Available when CPU Ratio is set to manual)

This option allows the user to set the ratio between the CPU Core Clock and the FSB Frequency. (**Note**: if an invalid ratio is entered, the AMI BIOS will restore the setting to the previous state.) The default setting depends on the type of CPU installed on the motherboard. The default setting for this motherboard is [**20**].

Sever Class

Use this item to identify the server class for your system so that the prefectcher settings listed below can be correctly configured. The options are Enterprise, **HPC (High Performance Cluster)** and Custom (for customized servers).

Hardware Prefetcher (Available when supported by the CPU)

If enabled, the hardware prefetcher will prefetch streams of data and instructions from the main memory to the L2 cache to improve CPU performance. The options are Disabled and **Enabled**.

Adjacent Cache Line Prefetch (Available when supported by the CPU)

If this feature is set to Disabled, the CPU prefetches the cache line for 64 bytes. If this feature is set to **Enabled**, the CPU prefetches both cache lines for 128 bytes as comprised.

MPS and ACPI MADT Ordering

This feature allows the user to configure the MPS (Multi-Processor Specifications) and ACPI settings for your motherboard. Select Modern Ordering if XP or a newer version of Windows OS is used in the motherboard. Select Legacy Ordering if 2000 or an earlier version is used. The options are **Modern Ordering** and Legacy Ordering.

Max CPUID Value Limit

This feature allows the user to set the maximum CPU ID value. Enable this feature to boot the legacy operating systems that cannot support processors with extended CPUID functions. The options are Enabled and **Disabled** (for the Windows OS).

Intel® Virtualization Technology (Available when supported by the CPU)

Select Enabled to enable Virtualization Technology support which will allow one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and Disabled. **Note**: If there is any change to this setting, you will need to power off and restart the system for the change to take effect. Please refer to Intel's Website for detailed information.

Execute-Disable Bit Capability (Available when supported by the OS and the CPU)

Select Enabled to enable the Execute Disable Bit support which will allow the processor to designate areas in the system memory where an application code can execute and where it cannot, thus preventing a worm or a virus from flooding illegal codes to overwhelm the processor or damaging the system during an attack. The default is **Enabled**. (Refer to Intel and Microsoft websites for more information.)

CPU Multi-Core Enable/Disable (Available when supported by the CPU)

Select Enabled to enable multi-core CPU support to enhance CPU performance. The options are Disabled and **Enabled.**

A20M

When the A20M# pin is enabled, it will force address bit 20 to zero (to be masked) to emulate the address wraparound for the real-address mode at 1 MB. Set this item to Enabled for the legacy operating systems and applications that require A20M support to work properly. The options are Enabled and **Disabled**.

Intel® SpeedStep™ Technology

Intel EIST (Enhanced Intel SpeedStep Technology) allows the system to automatically adjust the processor voltage and core frequency in an effort to reduce power consumption and heat dissipation. Please refer to Intel's Website for detailed information. The options are Disable (Disable GV3) and **Enable (Enable GV3)**.

Intel® TurboMode Tech (Available when Intel EIST Technology is enabled)

Select Enabled to use the TurboMode Technique to boost system performance. The options are **Enabled** and Disabled.

Performance/Walt Select

Use this feature to balance the need between system performance and energy saving. The options are **Traditional** and Power Optimized (for energy saving).

Intel® C-STATE Tech

If this feature is enabled, C-State is set by the system automatically to either C2, C3 or C4 state. The options are Disabled and **Enabled**. If this feature is set to Enabled, the following items will display.

C-State Package Limit Setting

If this feature is set to Auto, the AMI BIOS will automatically set the limit on the C-State package register. The options are **Auto**, C1, C3, C6 and C7.

C1 Auto Demotion

Select Enabled to allow the CPU to demote C3, C6, or C7 requests to C1 based on un-core auto-demote information. The options are Disabled and **Enabled.**

C3 Auto Demotion

If this feature is set to Enabled, the CPU will conditionally demote C6 or C7 requests to C3 based on un-core auto-demote information. The options are Disabled and **Enabled.**

ACPI T State

When this feature is enabled, CPU Throttling state will be reported in the ACPI (Advanced Configuration and Power Interface) protocol. The options are **Enabled** and Disabled.

▶Advanced Chipset Control

The items included in the Advanced Settings submenu are listed below.

▶CPU Bridge Configuration

▶QPI Configuration

QuickPath Interconnect (QPI) is the connection between the CPU and the motherboard's I/O hub. This section displays the following QPI items.

MMConfigBase

This item is used to select the space-based address for memory_mapped configuration. The options are **0x8000 0000**, 0x4000 0000, and 0xC000 0000.

MMIOH Size Per IOH

Use this feature to select the memory_mapped IOH size to be allocated to each IOH. The options are **2G**, 4G, 6G, and 8G.

Logical Interrupt Mode

This item is used to select the logical interrupt mode. The options are **Flat Mode** and Cluster Mode.

Cluster Mode Check Sampling

Select Enabled to check if the APICID in an IntPriUpd message is not zero. The options are **Enabled** and Disabled.

QPI Debug Message Output Level

This feature allows the user to decide the level of an QPI debug message to be sent to the user. The options are **Err/Warn/Info0/1**, Err/Warn/Info0, and Err/Warn.

CRC Mode

Use this feature to select the QPI CRC (Cyclic Redundancy Check) mode, which will determine how often the raw computer data stored in a network or a hard disk device is checked for CRC. The options are **8Bit CRC** and 16Bit Rolling CRC.

QPI (Quick Path Interconnect) Links Speed

Use this feature to set data transfer speed for QPI Link connections. The options are Slow and **Fast**.

QPI Frequency Select (Available if the item - QPI Link Speed is set to Fast)

This feature is used to set desired QPI frequency. The options are 4.800 GT, 5.866GT, 6.400 GT and **Auto**.

QPI Scrambling

Select Enabled to enable Bit-Shuffling support which will allow bits in the data flow to be shifted around for CRC checking during data transmission and receiving between the CPUs or between a CPU and an IO hub (IOH). The options are **Enabled** and Disabled.

▶Integrated Memory Controller Configuration

Interleave Type

Use this feature to select memory interleaving mode. Select Inter-Socket Block Interleaving to enable memory interleaving between blocks of memory installed in different DIMM slots. Select Intra-Socket Block Interleaving to enable memory interleaving between blocks of memory installed in the same DIMM slot. Select Automatic to allow BIOS to automatically select the memory interleaving mode for memory modules installed in the system. The options are No Interleaving, **Inter-Socket Block Interleaving**, Intra-Socket Block Interleaving, and Automatic.

Interleave Order

Use this feature to set the order of memory interleaving. The options are High Only, High Low, **Low High 0**, and Low High 1.

Mirroring

Mirroring support allows data stored in one location to be copied into another location for data redundancy and security. The options are listed below:

- **No Mirroring** (Mirroring Disabled),
- Intra-Socket Mirrored Nx1 to Nx3 (Memory Controller 1 to Memory Controller 3 of the same DIMM socket),
- Intra-Socket Mirrored Nx3 to Nx1 (Memory Controller 3 to Memory Controller 1 of the same DIMM socket),
- Inter-Socket Mirrored S0 (Socket 0) to S1 (Socket 1), and S2 (Socket 2) to S3 (Socket 3),

- Inter-Socket Mirrored S0 (Socket 0) to S2 (Socket 2) and S1 (Socket 1) to S3 (Socket 3),

- Inter-Socket Mirrored S0 (Socket 0) to S3 (Socket 3) and S1 (Socket 1) to S2 (Socket 2).

Spare Enable

Select Enabled to enable spare support for all sockets, creating a spare drive for each socket. The options are Enabled and **Disabled**.

Mapper Mode

Use this feature to set the memory_mapper mode, which is used to translate local physical addresses presented by a media device into DRAM memory addresses (in terms of rank, bank, row and column). Select Open to maximize open_page hits. Select Close to minimize rank conflicts and to maximize simultaneous read/write bandwidth to boost performance. Select Adaptive to spread power dissipation over different DIMM modules to avoid memory overheat. The options are **Close**, Open and Adaptive.

Frequency Limit

This feature forces a DDR3 memory module to run at a frequency other than what the system has detected. The available options are **Auto**, 800 MHz, 978 MHz, 1067 MHz, and **Auto.**

Initialization Mode

Use this feature to select the memory initialization mode. The options are Serial and **Parallel**.

Hemisphere Mode

This feature is used to set the memory hemisphere mode. Select Enabled to prevent CPU's cache agent 1 from accessing cache agent 2 in an effort to reduce memory latency and maximize performance. This setting requires that both DIMM modules and DRAM sizes are configured in the same way. Select Disabled to allow a CPU's cache agent 1 to access cache agent 2. The options are Disabled and **Enabled**.

Page Policy

Use this feature to configure Page Policy settings, which determine how memory blocks are cached in a DRAM buffer and a memory module accesses memory resources. Select Open to optimize memory performance. Select Close to use memory safe mode. Select Adaptive to balance safety and performance. The options are Close, **Open** and Adaptive.

Scheduler Policy

Use this feature to configure Scheduler_Policy settings. The scheduler is used to translate memory read/write commands into memory sub-commands for easy execution. Select Static Trade_Off to balance read/write priority. Select Static Read_Priority to optimize read latency and bandwidth. Select Static Write_Priority to optimize write bandwidth to expedite command writing and execution. Select Adaptive to minimize latency. The options are Static Trade_Off, Static Read_Priority, Static Write_Priority, and **Adaptive**.

ECC Check Time Interval

This feature is used to set the time interval between each ECC Memory checking. If an ECC error occurs, an error message will also be sent via IPMI. The options are 100 Msec, 1 Sec, 10 Sec, 1 Min, **5 Minutes**, and 10 Minutes.

▶North Bridge Configuration

This feature allows the user to configure North Bridge settings.

Relaxed Ordering

Select Enabled to enable PCI-Express Relaxed_Ordering support which will allow certain transactions to be executed first by passing other transactions that were issued earlier, violating the strict PCI-E ordering rules. The options are **Auto**, Disabled and Enabled.

Maximum Payload Size

This feature is used to set the maximum payload size for a PCI-Express device. Please refer to your add-on card user guide for the desired setting. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes, and Maximum supported.

Extended Tag Field

Select Enabled to use the 8-bit Tag field of a device as a requester. The options are **Auto**, Disabled and Enabled.

No Snoop

If this feature is set to Enabled, No_Snoop option for a PCI-Express device will be enabled. The options are **Auto**, Disabled and Enabled.

Maximum Read Request Size

This feature is used to set the maximum read request size for a PCI-Express device. The options are **Auto**, 128 Bytes, 256 Bytes, 512 Bytes, 1024 Bytes, 2048 Bytes, 4096 Bytes, and Maximum supported.

Active State Power Management

Select Enabled to use the power management for signal transactions between the PCI Express L0 and L1 Links. Select Enabled to configure PCI-Exp. L0 and L1 Link power states. The options are **Disabled** and Enabled.

Extended Synch

Select Enabled to generate extended synchronization patterns. The options are **Auto**, Disabled and Enabled.

Intel VT-d

Select Enabled to enable Intel Virtualization Technology support for Direct I/O VT-d by reporting the I/O device assignments to VMM through the DMAR ACPI Tables. This feature offers fully-protected I/O resource-sharing across the Intel platforms, providing the user with greater reliability, security and availability in networking and data-sharing. The settings are Enabled and **Disabled**.

Thermal Sensor

Select Enabled to activate the thermal sensor. The options are **Disabled** and Enabled.

▶South Bridge Configuration

This feature allows the user to configure Intel ICH South Bridge settings.

USB Functions

This feature allows the user to decide the number of onboard USB ports to be enabled. The Options are: Disabled, 2 USB Ports,4 USB Ports, 6 USB Ports, 8 USB Ports, 10 USB Ports, and **12 USB Ports**. (If this item is set to Enabled, USB 2.0 Controller will be enabled.)

USB Port Configuration

This feature is used to configure USB port settings. The Options are: **6x6 USB** Ports and 8x4 USB Ports.

USB 2.0 Controller

Select Enabled to activate the USB 2.0 Controller. The options are **Enabled** and Disabled. (**Note**: If the item - USB Functions is enabled, USB 2.0 Controller will always be enabled. When the item - USB Functions is set to Disabled, the user has the option to enable or disable USB 2.0 Controller.)

HDA Controller

Select Enabled to enable the High-Definition Audio Controller. The settings are **Enabled** and Disabled.

SMBUS Controller

Select Enabled to enable the System_Management Bus Controller. The settings are **Enabled** and Disabled.

SLP_S4# Min. Assertion Width

This feature allows the user to set the minimum SLP_S4# Assertion Width to make sure that DRAMs have safe power cycles. The settings are **4 to 5 seconds,** 3 to 4 Seconds, 2 to 3 Seconds, and 1 to 2 Seconds.

Restore on AC Power Loss

Use this feature to set the power state after a power outage. Select Power-Off for the system power to remain off after a power outage. Select Power-On for the system power to be turned on after a power outage. Select Last State to allow the system to resume its last state before the power outage. The options are Power-On, Power-Off and **Last State**.

SATA Master Break Event

If this feature is set to Enabled, activities on the SATA master drive will break from the C3/C6 state. The settings are Enabled and **Disabled**.

PCIE Ports Configuration

PCIE Port 0 ~ PCIE Port 4

This feature is used to configure PCI-E port settings. Select Auto to allow a specified PCIE port to be enabled if a PCIE device is detected. The settings are **Auto**, Enabled and Disabled.

PCIE High Priority Port

This feature allows the user to select the PCIE High Priority port. The settings are **Disabled**, Port 0, Port 1, Port 2, Port 3, Port 4, and Port 5.

PCIE Port 0 IOxAPIC Enable ~ PCIE Port 4 IOxAPIC Enable

Select Enable to enable IOxAPIC support for a PCIE port specified. The settings are Enabled and **Disabled**.

▶IDE/SATA Configuration

When this submenu is selected, the AMI BIOS will automatically detect the presence of the IDE/SATA devices, and displays the following items.

SATA#1 Configuration

If Compatible is selected, it sets SATA#1 to the legacy_compatible mode. Selecting Enhanced sets SATA#1 to the native SATA mode. The options are Disabled, Compatible and **Enhanced**.

Configure SATA#1 as (Not available when SATA#1 Configuration is disabled)

Use this feature to select the drive type for SATA#1. The options are **IDE,** RAID and AHCI. (When the option-RAID is selected, the item-ICH RAID Code Base will appear. When the option-AHCI is selected, the item-ICH AHCI Codebase will be available.)

ICH RAID Code Base (Available when the option-RAID is selected.)

Select Intel to use Intel's SATA RAID firmware to configure Intel's SATA RAID settings. Select Adaptec to use Adaptec's SATA RAID firmware to configure Adaptec's SATA RAID settings. The options are **Intel** and Adaptec.

ICH AHCI Codebase (Available when the option-AHCI is selected.)

Use this feature to select the AHCI Codebase for the ICH South Bridge. The options are BIOS Native Module and **Intel AHCI ROM**.

SATA#2 Configuration (Available when the option-IDE is selected.)

Select Enhanced to set SATA#2 to Native SATA mode. The options are Disabled and **Enhanced**.

Primary IDE Master/Slave, Secondary IDE Master/Slave, Third IDE Master, and Fourth IDE Master

These settings allow the user to set the parameters for the slots indicated above. Press <Enter> to activate the following submenu items. Set the correct configurations accordingly. The items included in the submenu are listed below.

Type

Use this item to select the type of device connected to the system. The options are Not Installed, **Auto**, CD/DVD and ARMD.

LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In the LBA mode, the maximum drive capacity is 137 GB. For drive capacities over 137 GB, your system must support a 48-bit LBA mode. If not, contact your manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode. The options are Disabled and **Auto**.

Block (Multi-Sector Transfer)

Block Mode boosts the IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if Block Mode is not used. Block Mode supports transfers of up to 64 KB per interrupt. Select Disabled to allow data to be transferred from and to a device one sector at a time. Select Auto to allow data transfer from and to a device multiple sectors at a time if the device supports it. The options are **Auto** and Disabled.

PIO Mode

The IDE PIO (Programmable I/O) Mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are **Auto**, 0, 1, 2, 3, and 4.

Select Auto to allow AMI BIOS to automatically detect the PIO mode. Use this value if the IDE disk drive support cannot be determined.

Select 0 to allow AMI BIOS to use PIO mode 0. It has a data transfer rate of 3.3 MB/s.

Select 1 to allow AMI BIOS to use PIO mode 1. It has a data transfer rate of 5.2 MB/s.

Select 2 to allow AMI BIOS to use PIO mode 2. It has a data transfer rate of 8.3 MB/s.

Select 3 to allow AMI BIOS to use PIO mode 3. It has a data transfer rate of 11.1 MB/s.

Select 4 to allow AMI BIOS to use PIO mode 4. It has a data transfer bandwidth of 32-Bits. Select Enabled to enable 32-Bit data transfer.

Select UDMA5 to allow BIOS to use Ultra DMA mode 5. It has a data transfer rate of 133 MB/s.

Select UDMA6 to allow BIOS to use Ultra DMA mode 6. It has a data transfer rate of 133 MB/s. The options are **Auto**, SWDMAn, MWDMAn, and UDMAn.

DMA Mode

Select Auto to allow BIOS to automatically detect IDE DMA mode when IDE disk drive support cannot be determined.

Select SWDMA0 to allow BIOS to use Single Word DMA mode 0. It has a data transfer rate of 2.1 MB/s.

Select SWDMA1 to allow BIOS to use Single Word DMA mode 1. It has a data transfer rate of 4.2 MB/s.

Select SWDMA2 to allow BIOS to use Single Word DMA mode 2. It has a data transfer rate of 8.3 MB/s.

Select MWDMA0 to allow BIOS to use Multi-Word DMA mode 0. It has a data transfer rate of 4.2 MB/s.

Select MWDMA1 to allow BIOS to use Multi-Word DMA mode 1. It has a data transfer rate of 13.3 MB/s.

Select MWDMA2 to allow BIOS to use Multi-Word DMA mode 2. It has a data transfer rate of 16.6 MB/s.

Select UDMA0 to allow BIOS to use Ultra DMA mode 0. It has a data transfer rate of 16.6 MB/s. It has the same transfer rate as PIO mode 4 and Multi-Word DMA mode 2.

Select UDMA1 to allow BIOS to use Ultra DMA mode 1. It has a data transfer rate of 25 MB/s.

Select UDMA2 to allow BIOS to use Ultra DMA mode 2. It has a data transfer rate of 33.3 MB/s.

Select UDMA3 to allow BIOS to use Ultra DMA mode 3. It has a data transfer rate of 44.4 MB/s.

Select UDMA4 to allow BIOS to use Ultra DMA mode 4. It has a data transfer rate of 66.6 MB/s.

Select UDMA5 to allow BIOS to use Ultra DMA mode 5. It has a data transfer rate of 100 MB/s.

Select UDMA6 to allow BIOS to use Ultra DMA mode 6. It has a data transfer rate of 133 MB/s. The options are **Auto**, SWDMAn, MWDMAn, and UDMAn.

S.M.A.R.T. For Hard disk drives

Self-Monitoring Analysis and Reporting Technology (SMART) can help predict impending hard disk drive failures. Select Auto to allow AMI BIOS to automatically detect hard disk drive support. Select Disabled to prevent AMI BIOS from using the S.M.A.R.T. Select Enabled to allow AMI BIOS to use the S.M.A.R.T. to support hard drive disk. The options are Disabled, Enabled and **Auto**.

32Bit Data Transfer

Select Enabled to support 32-bit IDE data transfer. The options are **Enabled** and Disabled.

Hard Disk Write Protect

Select Enabled to support Hard Disk Write Protect to prevent data from being written to a hard drive. The options are Enabled or **Disabled**.

IDE Detect Timeout (sec)

Use this feature to set the timeout value to allow BIOS to detect any installed ATA, ATAPI devices. The options are 0 (sec), 5, 10, 15, 20, 25, 30, and **35**.

▶PCI/PnP Configuration

Clear NVRAM

Select Yes to clear Non-Volatile Random Access (Flash) Memory (NVRAM) during system boot. The options are **No** and Yes.

Plug & Play OS

Select Yes to allow the OS to configure Plug & Play devices. (This is not required for system boot if your system has an OS that supports Plug & Play.) Select **No** to allow AMI BIOS to configure all devices in the system.

PCI Latency Timer

This feature sets the PCI Latency Timer for each PCI device installed on a PCI bus. Select 64 to set the PCI Latency Timer to 64 PCI clock cycles. The options are 32, **64**, 96, 128, 160, 192, 224 and 248.

Palette Snooping

Select Enabled to allow BIOS to inform PCI-E devices that an ISA graphics device is installed in the system so that the ISA graphics card can function properly. The options are **Disabled** and Enabled.

SR-IOV Supported

Single Root I/O Virtualization is an industry-standard mechanism that allows devices to be shared simultaneously among several virtual machines. SR-IOV is capable of partitioning a PCI device into several virtual interfaces in order to share the resources of a PCI Express (PCIe) device under a virtual environment. The options are **Disabled** and Enabled.

Onboard VGA Device

Select Enabled to use VGA devices. The options are Disabled and **Enabled**.

Boot Graphic Adapter Priority

This feature selects the graphics adapter to be used as the primary boot device. The options are **Auto** and Onboard VGA Device.

Onboard SAS OPROM

Select Enabled to enable Onboard SAS Option ROM which will allow you to boot the computer using a SAS device. The options are **Enabled** and Disabled.

Onboard LAN Option ROM Select

Select iSCSI to use iSCSI Option ROMs to boot the computer. Select PXE to use PXE Option ROMs to boot the computer. The options are iSCSI and **PXE**.

LAN1 Option ROM/LAN2 Option ROM

Select Enabled to enable the onboard LAN1/LAN2 Option ROMs to boot the computer using a network interface. The options are Enabled and **Disabled.**

▶Super IO Device Configuration

Serial Port1 Address/IRQ, Serial Port2 Address/IRQ

This option specifies the base I/O port address and the Interrupt Request address for Serial Port 1 and Serial Port 2. Select Disabled to prevent the serial port from accessing any system resources. When this option is set to Disabled, the serial port physically becomes unavailable. Select 3F8/IRQ4 to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. The options for Serial Port1 are Disabled, **3F8/IRQ4**, 3E8/IRQ4, 2E8/IRQ3 and 2F8/IRQ3. The options for Serial Port2 are Disabled, **2F8/IRQ3**, 3E8/IRQ4, 3F8/IRQ4, and 2E8/IRQ3.

▶USB Configuration

This feature allows the user to configure USB settings for the motherboard.

Legacy USB Support

Select Enabled to use Legacy USB devices. If this item is set to Auto, Legacy USB support will be automatically enabled if a legacy USB device is installed on the motherboard, and vise versa. The settings are Disabled, **Enabled** and Auto.

Port60h/64h Emulation

Select Enabled to enable 60h/64h emulation so that a USB keyboard can be supported by an operating system that is not compatible with USB devices. The options are Enabled and **Disabled.**

USB 2.0 Controller Mode

This setting allows you to select USB 2.0 Controller mode. The options are **Hi-Speed (480 Mbps)** and Full Speed (12 Mbps).

BIOS EHCI Hand-Off

Select Enabled to support BIOS Enhanced Host Controller Interface to provide a workaround solution for an operating system that does not support EHCI Hand-Off technology. When this item is enabled, the EHCI Interface will be changed from the BIOS-controlled to the OS-controlled. The options are Disabled and **Enabled**.

Legacy USB1.1 HC Support

Select Enabled to enable Legacy USB 1.1 HC support. The settings are Disabled and **Enabled**.

Hot-Plug USB FDD Support

When this item is set to Enabled, a dummy Floppy Device Drive will be created as a Hot-Plug Floppy device in the system. When this item is set to **Auto**, a dummy floppy device will not be created if no USB FDD device is detected. The options are Disabled, Enabled and **Auto**.

▶ACPI Configuration

Use this feature to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

▶Advanced ACPI Configuration

This feature allows the user to configure Advanced ACPI (Advanced Configuration and Power Interface) settings.

ACPI Version Features

Use this feature to select the ACPI version to be used in the system. The options are ACPI v1.0, **ACPI v2.0** and ACPI v3.0. Please refer to ACPI's Website for further explanation: http://www.acpi.info/.

ACPI APIC Support

Select Enabled to include the ACPI APIC Table Pointer in the RSDT (Root System Description Table) pointer list. The options are **Enabled** and Disabled.

AMI OEMB Table

Select Enabled to include the OEMB Table Pointer in the RSDT (Root System Description Table) pointer list. The options are **Enabled** and Disabled.

Headless Mode (Available ACPI Aware O/S='Yes')

This feature is used to enable system to function without a keyboard, monitor or mouse attached The options are Enabled and **Disabled**.

NUMA Support

Select Enabled to enable Non-Uniform Memory Access support to improve CPU performance for a system that has an OS with NUMA support. The options are **Enabled** and Disabled.

▶Chipset ACPI Configuration

This feature is used to configure Chipset ACPI (Advanced Configuration and Power Interface) settings.

Energy Lake Feature

Select Enabled to use Intel Energy Lake technology to enhance power efficiency. The options are **Disabled** and Enabled.

APIC ACPI SCI IRQ

When this item is set to Enabled, APIC ACPI SCI IRQ is supported by the system. The options are Enabled and **Disabled**.

USB Device Wakeup From S3/S4

Select Enable to wake up the system via a USB device when the system is in S3 or S4 State. The options are Enabled and **Disabled**.

High Precise Event Timer

Select Enabled to activate the High Precise Event Timer (HPET) to produce periodic interrupts at a much higher frequency than a Real-time Clock (RTC) does in synchronizing multimedia streams, providing smooth playback and reducing the dependency on other timestamp calculation devices, such as an x86 RDTSC Instruction embedded in the CPU. The High Performance Event Timer is used to replace the 8254 Programmable Interval Timer. The options are Enabled and **Disabled**.

▶General WHEA Configuration

WHEA Support

Select Enabled to support the Windows Hardware Error Architecture (WHEA) platform and provide a common infrastructure for the system to handle hardware errors within the Windows OS environment to reduce system crashes and to enhance system recovery and health monitoring. The options are **Enabled** and Disabled.

▶Event Log Configuration

View Event Log

Use this option to view the System Event Log.

Mark All Events as Read

This option marks all events as read. The options are **OK** and Cancel.

Clear Event Log

This option clears the Event Log memory of all messages. The options are **OK** and **Cancel.**

▶Hardware Health Event Monitoring

This feature is used to monitor system health and review the status of each item as displayed.

CPU Overheat Alarm

This option allows the user to select the CPU Overheat Alarm setting which determines when the CPU OH alarm will be activated to provide warning of possible CPU overheat.

Warning! 1.Any temperature that exceeds the CPU threshold temperature predefined by the CPU manufacturer may result in CPU overheat or system instability. When the CPU temperature reaches this predefined threshold, the CPU and system cooling fans will run at full speed. 2. To avoid possible system overheating, please be sure to provide adequate airflow to your system.

The options are:

- The Early Alarm: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered as soon as the CPU temperature reaches the CPU overheat threshold as predefined by the CPU manufacturer.

- **The Default Alarm**: Select this setting if you want the CPU overheat alarm (including the LED and the buzzer) to be triggered when the CPU temperature reaches about 5ºC above the threshold temperature as predefined by the CPU manufacturer to give the CPU and system fans additional time needed for CPU and system cooling. In both the alarms above, please take immediate action as shown below.

CPU 1 Temperature ~ CPU 4 Temperature/System Temperature 1 Reading~ System Temperature 4 Reading

This feature displays current temperature readings for the CPU and the System as specified above.

The following items will be displayed for your reference only:

CPU 1 Temperature ~ CPU 4 Temperature

The CPU thermal technology that reports absolute temperatures (Celsius/Fahrenheit) has been upgraded to a more advanced feature by Intel in its newer processors. The basic concept is each CPU is embedded by unique temperature information that the motherboard can read. This ‘Temperature Threshold’ or ‘Temperature Tolerance’ has been assigned at the factory and is the baseline on which the motherboard takes action during different CPU temperature conditions (i.e., by increasing CPU Fan speed, triggering the Overheat Alarm, etc). Since CPUs can have different ‘Temperature Tolerances’, the installed CPU can now send informa-

tion to the motherboard what its 'Temperature Tolerance' is, and not the other way around. This results in better CPU thermal management.

Supermicro has leveraged this feature by assigning a temperature status to certain thermal conditions in the processor (Low, Medium and High). This makes it easier for the user to understand the CPU's temperature status, rather than by just simply seeing a temperature reading (i.e., 25°C). The CPU Temperature feature will display the CPU temperature status as detected by the BIOS:

Low – This level is considered as the 'normal' operating state. The CPU temperature is well below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS (Fan Speed Control).

User intervention: No action required.

Medium – The processor is running warmer. This is a 'precautionary' level and generally means that there may be factors contributing to this condition, but the CPU is still within its normal operating state and below the CPU 'Temperature Tolerance'. The motherboard fans and CPU will run normally as configured in the BIOS. The fans may adjust to a faster speed depending on the Fan Speed Control settings.

User intervention: No action is required. However, consider checking the CPU fans and the chassis ventilation for blockage.

High – The processor is running hot. This is a 'caution' level since the CPU's 'Temperature Tolerance' has been reached (or has been exceeded) and may activate an overheat alarm.

User intervention: If the system buzzer and Overheat LED has activated, take action immediately by checking the system fans, chassis ventilation and room temperature to correct any problems.

Notes: 1. The system may shut down if it continues for a long period to prevent damage to the CPU.

2. The information provided above is for your reference only. For more information on thermal management, please refer to Intel's _ at www.Intel.com.

System Temperature 1 Reading ~ System Temperature 4 Reading

The system temperature as specified above will be displayed (in degrees in Celsius and Fahrenheit) as it is detected by the BIOS.

Fan 1 Speed ~ Fan 11 Speed

This feature displays the fan speed readings from fan interfaces Fan 1 through Fan 10.

Fan Speed Control Modes

This feature allows the user to decide how the system controls the speeds of the onboard fans. The CPU temperature and the fan speed are correlative. When the CPU on-die temperature increases, the fan speed will also increase for effective system cooling. Select "Full Speed/FS" to allow the onboard fans to run at full speed for maximum cooling. The FS setting is recommended for special system configuration or debugging. Select "Performance/PF" for better system cooling. The PF setting is recommended for high-power-consuming and high-density systems. Select "Balanced/BL" for the onboard fans to run at a speed that will balance the needs between system cooling and power saving. The BL setting is recommended for regular systems with normal hardware configurations. Select "Energy Saving/ES" for best power efficiency and maximum quietness. The Options are: Full Speed/FS, Performance/PF, **Balanced/BL**, and Energy Saving/ES.

Voltage Monitoring

CPU1 Vcore, CPU2 Vcore, CPU3 Vcore, CPU4 Vcore, +1.0V, +1.2V, +1.8V, +1.1V, +12V, 1.5V, 3.3V V, 3.3VSB, Battery Voltage, and IOPV12.

▶IPMI Configuration

Intelligent Platform Management Interface (IPMI) is a set of common interfaces that IT administrators uses to monitor system health and to manage the system as a whole. For more information on the IPMI specifications, please visit Intel's Website at www.intel.com.

Status of BMC

The Baseboard Management Controller (BMC) manages the interface between system management software and platform hardware. This item displays the status of the current BMC controller.

IPMI Firmware Version

This item displays the current IPMI Firmware Version.

▶View BMC System Event Log

This feature displays the BMC System Event Log (SEL). It shows the total number of entries of BMC System Events. To view an event, select an Entry Number and press <Enter> to display the information as shown in the screen.

- Total Number of Entries
- SEL Record ID
- SEL Record Type

- Event Timestamp
- Generator ID
- Event Message Format Ver.
- Event Sensor Type
- Event Sensor Number
- Event Dir Type
- Event Data.

Clear BMC System Event Log

Clear BMC System Log now

Select OK and press <Enter> to clear the BMC system log immediately. Select Cancel to keep the BMC System log. The options are **OK** and Cancel.

Caution: Any cleared information is unrecoverable. Make absolutely sure that you will no longer need any data stored in the log before clearing the BMC Event Log.

▶Set LAN Configuration

This feature allows the user to configure the IPMI LAN adapter with a network address as shown in the following graphics.

Channel Number - This feature displays the channel number.

Channel Number Status - This feature returns the channel status for the Channel Number selected above: "Channel Number is OK" or "Wrong Channel Number".

▶IP Address

Parameter Selector

This item displays the status of the IP Address Parameter Selector.

IP Address Source

This features allows the user to select how an IP address is assigned to a client computer or network device. Select DHCP (Dynamic Host Configuration Protocol) to allow a client (computer or device) to obtain an IP address from a DHCP server that manages a pool of IP addresses and network information on

a "request and grant" basis. Upon timeout (or lease expiration), the IP address assigned to the client can be reassigned to a new client. Select Static (Static Allocation) to allow the host server to allocate an IP address based on a table containing MAC Address/IP Address pairs that are manually entered (probably by a network administrator). Only clients with a MAC address listed in the MAC/IP Address Table will be assigned an IP address. The IP Address allocated to the client is on a longer term basis than that assigned by the DHCP mentioned in the other option. The options are **DHCP** and Static.

IP Address

The BIOS will automatically enter the IP address for this machine; however it may be overwritten. The value of each three-digit number separated by dots should not exceed 255.

Current IP Address in BMC

The BIOS will automatically enter the current IP address in BMC for this machine; however it may be overwritten. The value of each three-digit number separated by dots should not exceed 255.

▶MAC Address Configuration

Parameter Selector

This item displays the status of the MAC Address Parameter Selector.

Current Mac Address in BMC

The BIOS will automatically enter the current Mac address in BMC for this machine; however it may be overwritten. Mac addresses are 6 two-digit hexadecimal numbers (Base 16, 0 ~ 9, A, B, C, D, E, F) separated by dots. (i.e., 00.30.48.D0.D4.60).

▶Subnet Mask Configuration

Parameter Selector

This item displays the status of the Parameter Selector.

Subnet Mask

This item displays the current subnet mask setting for your IPMI connection. The value of each three-digit number separated by dots should not exceed 255.

Current Subnet Mask in BMC

The BIOS will automatically enter the current subnet mask in BMC for this machine; however it may be overwritten. The value of each three-digit number separated by dots should not exceed 255.

▶Gateway Address

Parameter Selector

This item displays the status of the Gateway Address Parameter Selector.

Gateway Address

The BIOS will automatically enter the Gateway address of this machine; however it may be overwritten. The value of each three-digit number separated by dots should not exceed 255.

Current IP Address in BMC

The BIOS will automatically enter the current IP address in BMC for this machine; however it may be overwritten. The value of each three-digit number separated by dots should not exceed 255.

▶Remote Access Configuration

Remote Access

This allows the user to enable the Remote Access support. The options are Disabled and **Enabled**. If Remote Access is set to Enabled, the following items will display:

Serial Port Number

This feature allows the user to decide which serial port to use for Console Redirection. The options are COM 1 and **COM 2**.

Base Address, IRQ

This item displays the based address and IRQ of the serial port specified.

Serial Port Mode

Use this item to set the serial port mode for Console Redirection. The options are **115200 8, n 1**; 57600 8, n, 1; 38400 8, n, 1; 19200 8, n, 1; and 9600 8, n, 1.

Flow Control

This feature allows the user to set the flow control for Console Redirection. The options are **None**, Hardware, and Software.

Redirection After BIOS POST

Select Disabled to turn off Console Redirection after Power-On Self-Test (POST). Select Always to keep Console Redirection active all the time after POST. (**Note**: This setting may not be supported by some operating systems.) Select Boot Loader to keep Console Redirection active during POST and Boot Loader. The options are Disabled, Boot Loader, and **Always**.

Terminal Type

This feature allows the user to select the target terminal type for Console Redirection. The options are **ANSI**, VT100, and VT-UTF8.

VT-UTF8 Combo Key Support

A terminal keyboard definition that provides a way to send commands from a remote console. The options are **Enabled** and Disabled.

Sredir Memory Display Delay

This feature defines the length of time in seconds to display memory information. The options are **No Delay,** Delay 1 Sec, Delay 2 Sec, and Delay 4 Sec.

▶Trusted Computing (Optional)

TCG/TPM Support

Select Yes on this item and enable the TPM jumper on the motherboard to enable TCG (TPM 1.1/1.2)/TPM support to improve data integrity and network security. The options are **No** and Yes. If this feature is set to Yes, the following items will display.

Indicate Physical (Available when TCG/TPM Support = 'Yes')

Select Yes for BIOS to detect the presence of TPM devices at system boot. Select No to hide the presence of TPM devices at system boot. The options are Yes and **No**.

TPM Deactivated (Available when TCG/TPM Support = 'Yes')

Select Set to disable TPM support at bootup. Select Clear to activate the TPM devices to at bootup. Select Don't Change to keep the current TPM support status. The options are Set, Clear, and **Don't Change**.

TPM Owner (Available when TCG/TPM Support = 'Yes')

This feature allows the user to configure TPM Owner settings. The options are **Don't Change**, Enable Install, Disable Install, and Clear.

Execute TPM Command (Available when TCG/TPM Support = 'Yes')

Select Enabled to execute TPM commands you've selected. Select Don't Change to keep the current TPM commands without making any changes. Select Disabled to abandon the changes you have made on TPM commands. The options are Enabled, Disabled and **Don't Change**.

TPM Enable/Disable Status

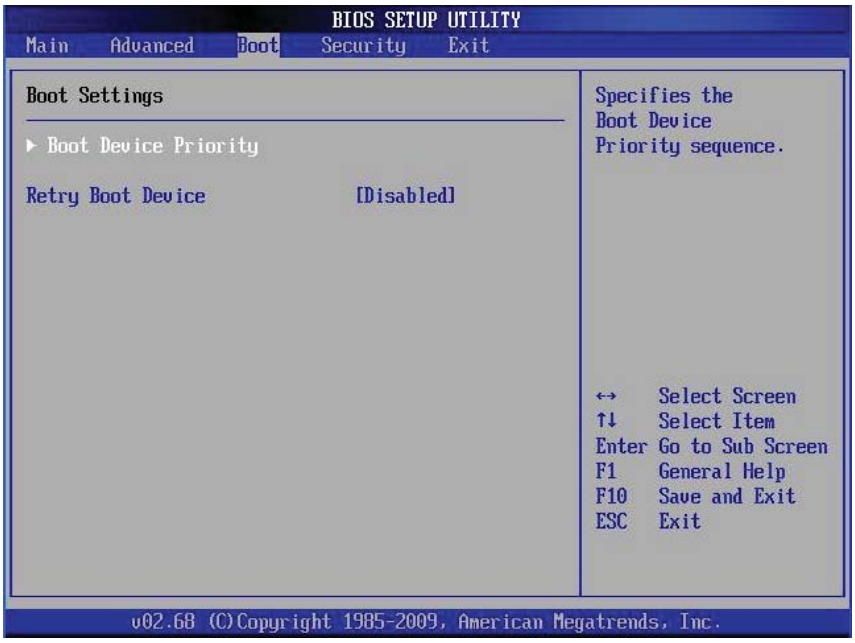
This item displays the status of TPM Support to indicate if TPM is currently enabled or disabled.

TPM Owner Status

This item displays the status of TPM Ownership.

7-4 Boot Configuration

Use this feature to configure boot settings.



▶Boot Device Priority

This feature allows the user to specify the sequence of priority for the Boot Device. The settings are 1st boot device, 2nd boot device, 3rd boot device, 4th boot device, 5th boot device and Disabled.

- 1st Boot Device - [SATA: XXXXXXXXX]

▶Hard Disk Drive, CD/DVD-ROM Drive, Removable Drive

This feature allows the user to specify the boot sequence from all available hard disk drives. The settings are Disabled and a list of all hard disk drives that have been detected (i.e., 1st Drive, 2nd Drive, 3rd Drive, etc).

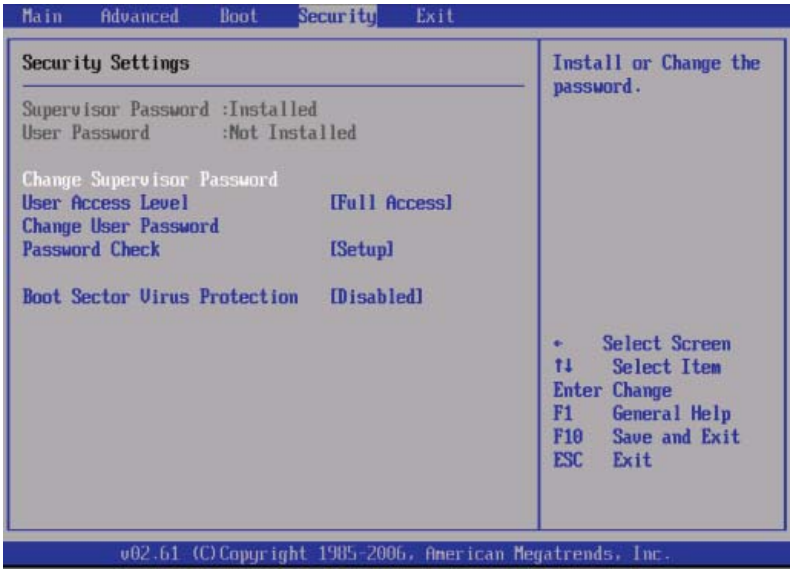
- 1st Drive - [SATA: XXXXXXXXX]

Retry Boot Devices

Select Enabled to enable Retry Boot Devices support to allow the system to attempt to boot from a specific boot device after a boot failure. The options are Enabled and **Disabled**.

7-5 Security Settings

The AMI BIOS provides a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.



Supervisor Password

This item indicates if a Supervisor password has been entered for the system. "Not Installed" means a Supervisor password has not been used.

User Password

This item indicates if a user password has been entered for the system. "Not Installed" means that a user password has not been used.

Change Supervisor Password

Select this feature and press <Enter> to access the submenu, and then enter a new Supervisor Password.

User Access Level (Available when Supervisor Password is set as above)

Select **Full Access** to grant full User read and write access to the Setup Utility. Select View Only to allow the user to view the Setup Utility settings without changing the fields. Select Limited to allow the user to access and change limited fields such as Date and Time. Select No Access to prevent the user from accessing the Setup Utility.

Change User Password

Select this feature and press <Enter> to access the submenu and enter a new User Password.

Clear User Password (Available only when User Password has been set)

This item allows the user to clear a user password after it has been entered.

Password Check

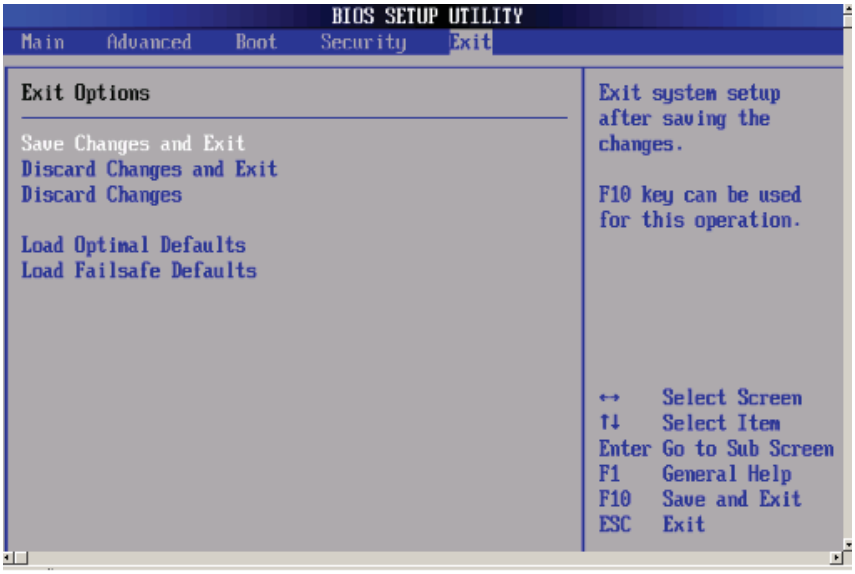
Select Setup for the system to check for a password at Setup. Select Always for the system to check for a password at bootup. The options are **Setup** and Always.

Boot Sector Virus Protection

If this item is enabled, AMI BIOS displays a warning if any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The options are Enabled and **Disabled**.

7-6 Exit Options

Select the Exit tab from the AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen.



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave the BIOS Setup Utility and reboot the computer so that the new system configuration parameters can take effect. Select Save Changes and Exit from the Exit menu and press <Enter>.

Discard Changes and Exit

Select this option to quit the BIOS Setup without making any permanent changes to the system configuration and reboot the computer. Select Discard Changes and Exit from the Exit menu and press <Enter>.

Discard Changes

Select this option and press <Enter> to discard all the changes and return to the AMI BIOS Utility Program.

Load Optimal Defaults

To set this feature, select Load Optimal Defaults from the Exit menu and press <Enter>. Then, select OK to allow the AMI BIOS to automatically load Optimal Defaults to the BIOS Settings. The Optimal settings are designed for maximum system performance but may not work best for all computer applications.

Load Fail-Safe Defaults

To set this feature, select Load Fail-Safe Defaults from the Exit menu and press <Enter>. The Fail-Safe settings are designed for maximum system stability but not for maximum performance.

Appendix A

BIOS POST Error Codes

During the POST (Power-On Self-Test) routines, which are performed each time the system is powered on, errors may occur.

Non-fatal errors are those which, in most cases, allow the system to continue the boot-up process. The error messages normally appear on the screen.

Fatal errors will not allow the system to continue the boot-up procedure. If a fatal error occurs, you should consult with your system manufacturer for possible repairs.

BIOS POST Error Codes

Beep Code	Error Message	Description
1 beep	Refresh	Circuits have been reset. (Ready to power up)
5 short beeps + 1 long beep	Memory error	No memory detected in the system
1 long beep + 8 short beeps	Display memory read/write error or no video	No video display, video adapter missing or with faulty memory
Continuous high (pitch) + low (pitch)	System Overheat	System overheat

Notes

Appendix B

System Specifications

Processors
Two Intel Xeon E5-2600 series processors

Note: Please refer to our web site for a complete listing of supported processors.

Chipset
Intel C602

BIOS
32 Mb AMIBIOS® SPI Flash ROM

Memory Capacity
Eight DIMM sockets supporting up to 256 GB of registered ECC DDR3-1600/1333/1066/800 MHz RDIMMs

Note: See the memory section in Chapter 5 for details.

GPUs (Graphics Processing Units)
A total of three GPUs are supported (true PCI-E 3.0 x16 signal)

SATA Controller
Intel on-chip controller for 10 SATA ports (RAID 0, 1, 5 and 10)

Drive Bays
Four 2.5" hot-swap drive bays to house SATA drives

Expansion Slots
Up to four PCI-E 3.0 cards with the use of riser cards

Serverboard
X9DRG-HF (proprietary ATX form factor)
Dimensions: 19.7" x 9.2" (500.4 x 233.7 mm)

Chassis
SC118GQ-R1800B (1U rackmount)
Dimensions: (WxHxD) 17.2 x 1.7 x 30.6 in. (437 x 43 x 777 mm)

System Cooling

Ten sets of 4-cm counter-rotating cooling fans (fan speed controlled by BIOS setting)

System Input Requirements

AC Input Voltage: 100-240 VAC
Rated Input Current: 1000W: 100-120V/12-10A, 1200W: 120-140V/12-10A, 1800W: 200-240V/10-8.5A
Rated Input Frequency: 50-60 Hz

Power Supply

Rated Output Power: 1800W (Part# PWS-1K81P-1R)
Rated Output Voltages: +12V (150A), +5Vsb (4A)

Operating Environment

Operating Temperature: 10º to 35º C (50º to 95º F)
Non-Operating Temperature: -40º to 70º C (-40º to 158º F)
Operating Relative Humidity: 8% to 90% (non-condensing)
Non-Operating Relative Humidity: 5 to 95% (non-condensing)

Regulatory Compliance

Electromagnetic Emissions: FCC Class A, EN 55022 Class A, EN 61000-3-2/-3-3, CISPR 22 Class A

Electromagnetic Immunity: EN 55024/CISPR 24, (EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-4-8, EN 61000-4-11)

Safety: CSA/EN/IEC/UL 60950-1 Compliant, UL or CSA Listed (USA and Canada), CE Marking (Europe)

California Best Management Practices Regulations for Perchlorate Materials: This Perchlorate warning applies only to products containing CR (Manganese Dioxide) Lithium coin cells. “Perchlorate Material-special handling may apply. See www.dtsc.ca.gov/hazardouswaste/perchlorate”

(continued from front)

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Notes